Founded in 1832

RAILWAY LOCOMOTIVES AND CARS

APRIL 1954

FOR OFFICERS AND SUPERVISORS RESPONSIBLE FOR DESIGN, CONSTRUCTION AND MAINTENANCE OF MOTIVE POWER AND ROLLING STOCK

formerly RAILWAY Mechanical and Electrical Engineer

HERE'S HOW TO OPERATE ON A 40 HOUR WEEK

. . . AND LIKE IT!

With shop and maintenance personnel off the job during week-ends, mechanical servicing on hot-shot freight schedules is a real problem.

Because a high percentage of road delays is due to brake beam troubles requiring brake head changes—Truslock's *quick-change at the car* brake head keeps top priority lading rolling. Changing a Truslock brake head is a stop watch operation, completed in a matter of minutes—not a brake beam removal project requiring jacking of the car.

Now—reduced week-end maintenance crews can change brake heads—quick and easy—just as they change brake shoes, while the rest of the gang's out fishing.

The 5-day week is here to stay. Let's live with it—and like it.

TRUSLOCK — THE PREMIUM MAINTENANCE BRAKE BEAM

BUFFALO BRAKE BEAM COMPANY

NEW YORK • BUFFALO • HAMILTON, ONT.

Photo shows typical rubber products. All rubber parts are made to exacting specifications right at the Westinghouse Air Brake Company plant so that quality can be closely controlled.

FOR GENUINE ECONOMY

get genuine replacement parts direct from Westinghouse Air Brake

GENUINE is the word for Westinghouse Air Brake replacement parts. They are a real help to your maintenance forces in restoring brake equipment to original manufacturer's standards. It is important that these standards be maintained to realize functional reliability for which air brake equipment has long been noted.

Westinghouse Air Brake
COMPANY
AIR BRAKE DIVISION WILMERDING, PA.

April, 1954

VOLUME 128

No. 4

RAILWAY LOCOMOTIVES AND CARS

Founded in 1832 as the American Rail-Road Journal.

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PRINTED BY PERIODICAL PRESS CORP., PHILA. 23, PA.

87 world's

Result of intensive study by Magor and Orinoco Engineers . . .

These ore cars utilize the best features of existing ore cars, with a number of innovations and improvements for service on the Orinoco. ASF Ride-Control Trucks, Bolsters, Simplex Brakes and Type "F" Interlocking Couplers are standard equipment.

They've found the answers to some problems that are unique in railroading . . . on

miles of the toughest main line!

• To fully appreciate what "Orinoco" means to railroading, you'd have to run a 15-thousand-ton train through 87 miles of rough terrain involving a 3% grade. That, in brief, describes United States Steel's engineering feat that stretches from the Orinoco mine face to the Puerto Ordaz docks in Venezuela.

Hauling heavy loads under these conditions calls for unusually rugged ore cars. Magor Car Corporation is providing the answer: cars that are designed to take extreme punishment—*almost continuously*. Otherwise, repairs would run costs sky-high in an area with restricted maintenance opportunities.

Smooth-riding ASF Ride-Control Trucks mean less damage to the cars and roadbed. ASF Simplex Clasp Brakes ease the loaded cars down the grade, and ASF Type "F" Interlocking Couplers provide the needed additional strength and protection against accidental train partings.

It's a source of pride that ASF was selected to furnish the basic running gear, of course. The problems of the Orinoco were a challenge to the best we had to offer. Helping to solve them is the kind of experience that keeps ASF in step with progressive railroading.

AMERICAN STEEL FOUNDRIES

410 N. Michigan Avenue, Chicago 11, Illinois

Canadian Sales: International Equipment Co., Ltd., Montreal 1, Quebec

ASF

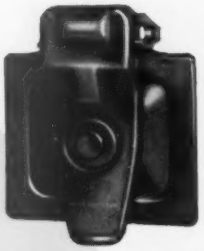
World's largest builders of railroad running gear

designed for long service

MOTOR WHEEL Journal Box Lids

1. No more worn holes or hinge pin scoring! This hinge pin is supported by full ¾" bearing on lid.
2. NO HAMMERING OR FASTENING REQUIRED TO INSERT OR SECURE HINGE PIN. Stops formed at ends of bearing hold straight hinge pin in position under spring pressure.
3. During shipment or storage, keeper pin holds assembly under pressure. When hinge pin is inserted, only hand pressure is required to remove keeper pin. NO TOOLS NECESSARY!
4. Two sheared ears hold coil spring and roller assembly snugly. Roller operates freely over journal box lug, lets lid open and close easily without wearing lug.
5. Full articulation up, down, right, or left permitted by center construction. Tight fit assured. Articulation point is oil tight and permanent because of series of press fits and shear riveting.
6. Full pressed-steel construction, 3/16" in housing and 5/32" in cover.
7. Opens full 120° for easy access to journal.
8. Extended housing arm eliminates opening and closing strain on articulating point.

Certified by A.A.R.
to latest Spec M-120-47



STANDARD MODEL

All above features are found on standard models. However, the deep flange model provides ADDITIONAL protection from wind-driven foreign matter and moisture.

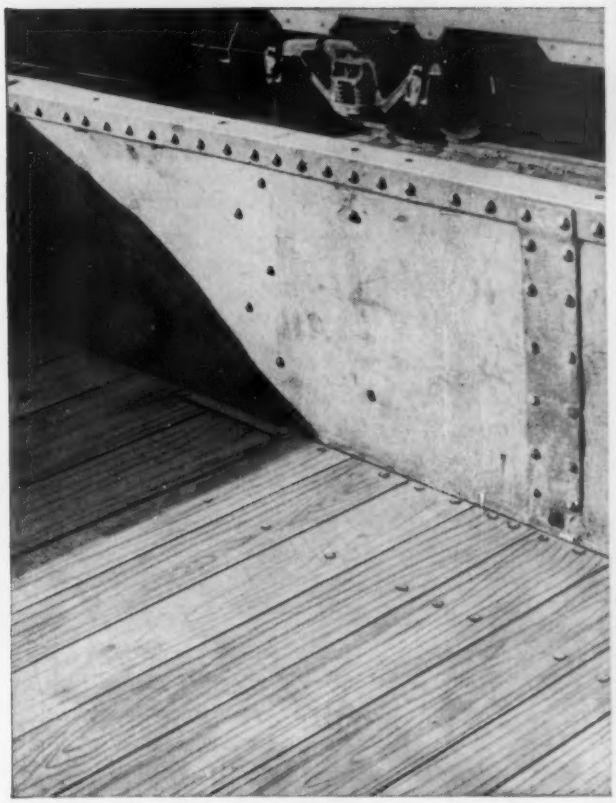
MOTOR WHEEL CORPORATION
LANSING 3, MICHIGAN, U. S. A.

National Railway Sales Representative
T-Z RAILWAY EQUIPMENT CO.
G. S. TURNER, *President*
8 South Michigan, Chicago 3, Illinois

PENTA

DOW

CLEAN WOOD PRESERVATIVE PROTECTS B & O CAR LUMBER AGAINST COSTLY HIDDEN DECAY



Maintenance-conscious Baltimore and Ohio Railroad now keeps gondolas and flatcars working months longer between trips to the repair shop. Clean PENTA* wood preservative measurably adds to the serviceability of this great railway's car flooring and framing. Off-track time and lumber replacement costs are held down because PENTA affords positive protection against rot, helps lumber stand up to the mechanical wear normally accelerated by this hidden decay.

Stock pens, loading chutes, platforms and other structures, too, stay safe and fully serviceable much longer when wood is pressure-processed with PENTA.

Combined with this long-lasting effectiveness is PENTA's *cleanliness*—lumber looks more attractive without painting, and is much easier to handle in every way.

Be sure to include PENTA in your specifications for *both* new car construction and all repair lumber—you'll receive greater ton mileage for every dollar invested. For more information about clean, measurable *PENTAchlorophenol protection, write to THE DOW CHEMICAL COMPANY, Midland, Michigan.

THE DOW CHEMICAL COMPANY
Dept. PE-754H Midland, Michigan

Please send me:

☐ List of PENTA-treating plants.

☐ Literature on car lumber treatment.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

you can depend on DOW CHEMICALS

DOW

Dayton 1" BC-5 V-Belts Key to Positive Power En Route

Mechanical Engineers for *31 major* railroads endorse Dayton 1" D-R V-Belts as solution to ever-increasing demand for continuous, dependable power.

THE PROBLEM

Major railroads report increased power failures resulting from heavier and heavier demands for electrical power on the generators. The connected car load, in some cases, actually exceeds generator capacity! In many instances, inability of the generators to develop full-rated power was traceable directly to the old style belt drives.

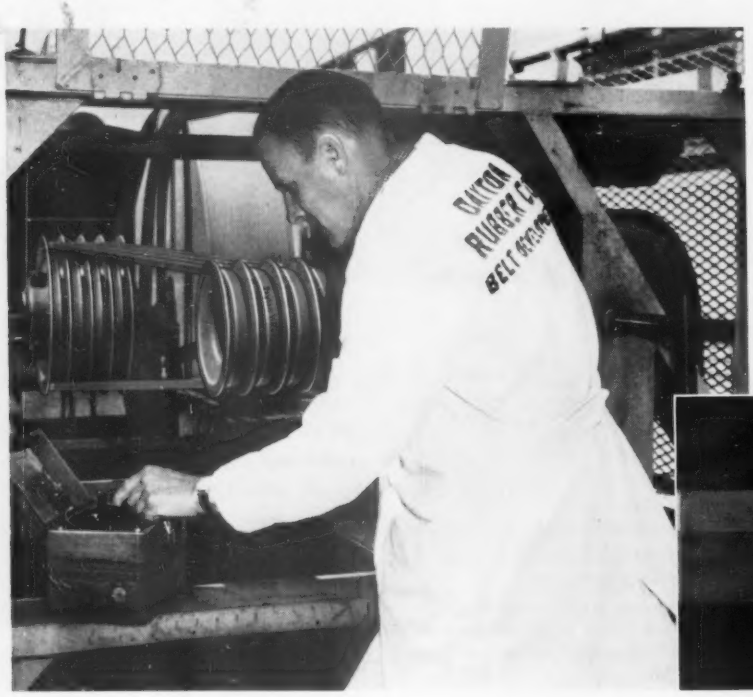
Bearing the brunt of a load in excess of that for which they were designed, the belts slipped, lost power, pulled apart at connectors and, all too frequently, broke entirely. Inadequate power, depleted reserves and recurring power interruptions resulted when these failures occurred. Service efficiency was lowered, costs went up. Then the individual railroads called in Dayton Railway Field Engineers for a solution to the problem.

THE SOLUTION

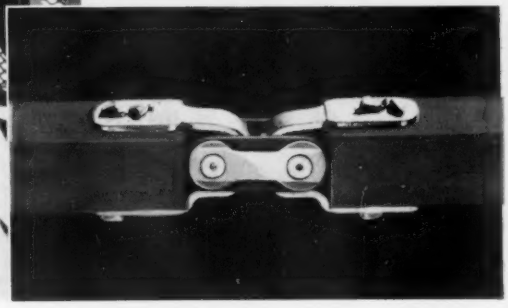
The problem was solved quickly and effectively by Dayton Field Engineers working hand-in-hand with the Mechanical Departments of the various railroads. Dayton engineers specified Dayton 1" BC-5 V-Belts because of their greater strength and holding power on the pulleys and at connectors. Immediate installation followed by trial runs proved the wisdom of the choice. Dayton 1" BC-5 V-Belts outperformed all other type belting without exception.

Power interruptions were practically eliminated. Harder gripping Dayton 1" BC-5 V-Belts developed more power, and, in addition, built up reserves. Frequent and costly yard recharging was reduced to an absolute minimum with these sturdier, longer-lasting Dayton V-Belts. Important savings in time, labor and belt replacement combined with increased miles of uninterrupted service—as much as 35% to 72% more—brought enthusiastic endorsement from the Engineers in charge.

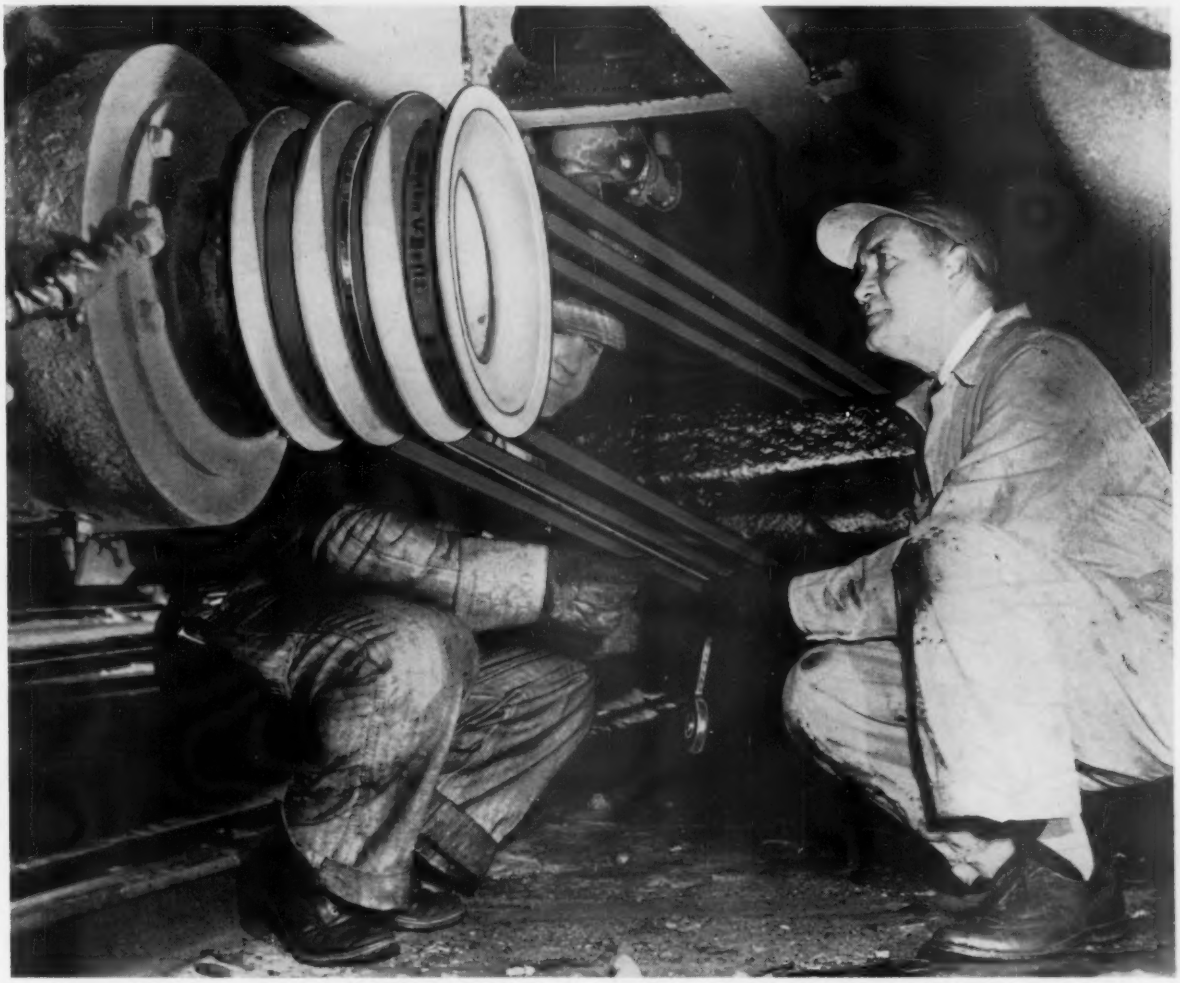
Making the change to Dayton 1" D-R (BC-5) V-Belts effected such a remarkable improvement in generator service on first line trains that these major railroads are continuing to apply V-Belt axle drives exclusively to their secondary equipment.



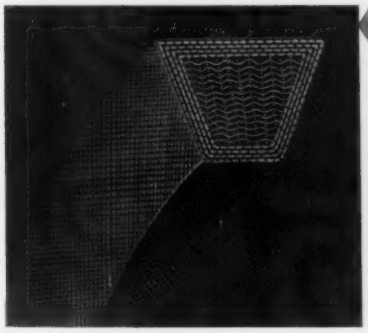
Dayton Railway V-Belts undergo strenuous laboratory tests prior to installation. Here, Dayton belt lab engineer simulates actual road conditions in testing 1" BC-5 Dayton V-Belts. Note how pulleys are offset to duplicate action of railroad trucks on curve.



Dayton 1" BC-5 V-Belts provide the extra margin of dependability essential to uninterrupted service. Especially designed for use with Connectors . . . easy to apply. Connectors operate smoothly over all pulley diameters.



Dayton Railway Field Engineers offer complete assistance on your V-power transmission problems, without obligation. For complete information write direct to: Dayton Rubber Co., Railway Division, Dept. 203, Dayton 1, Ohio.



Dayton V-Belts are rugged, resilient and powerful. Internal construction offers maximum horizontal and vertical flexibility and longer connector life. Full plied core provides greater tensile strength, stronger grip.

Dayton 1" Railway V-Belts offer new economy and convenience when purchased in 250 ft. reels. Handle easily. Cut quickly to desired length. Specify: 250 foot reel BC-5 Railway 1" V-Belt.

Railway V-Belts by

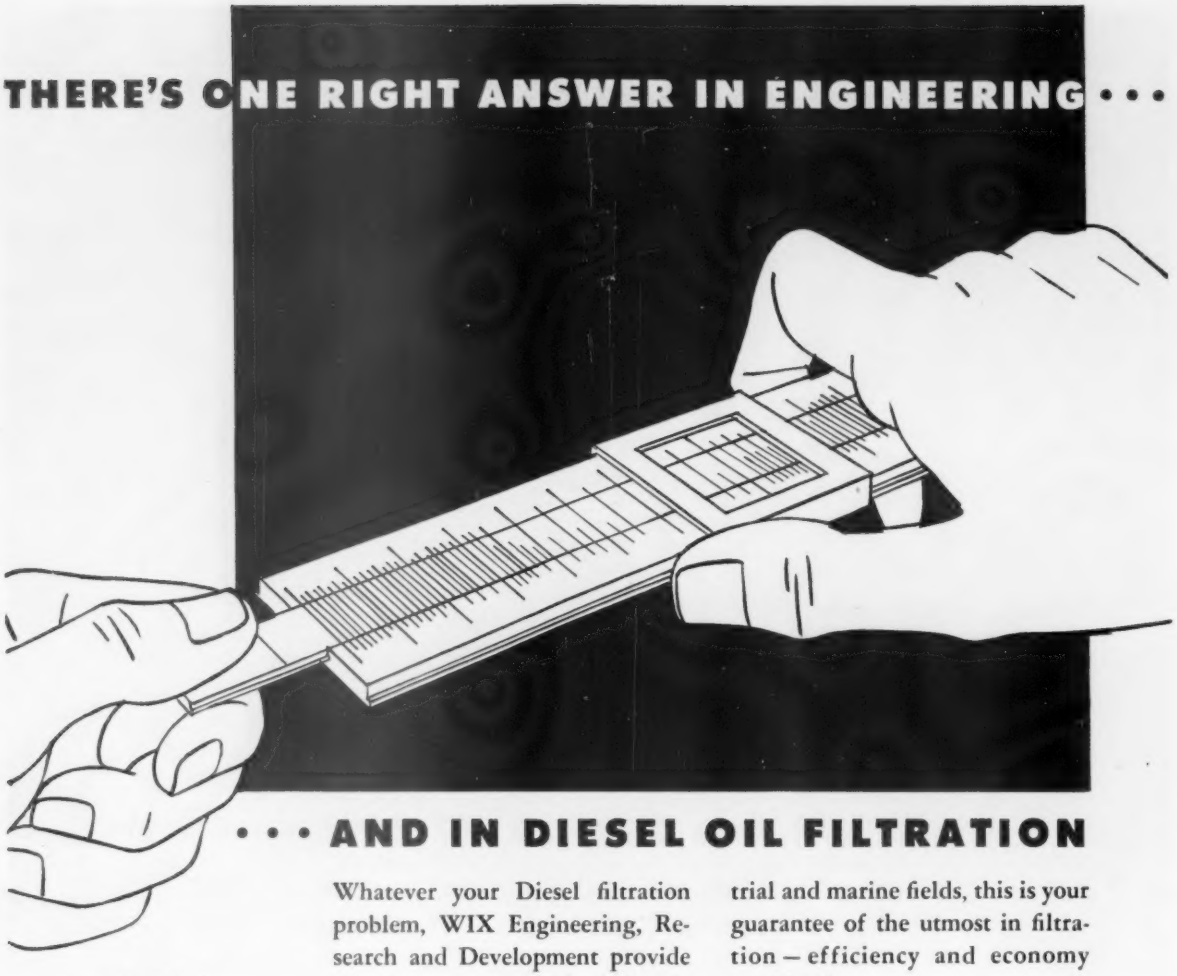
Dayton Rubber

Since 1905

World's Largest Manufacturer of V-Belts

DAYTON RUBBER CO., RAILWAY DIVISION, DAYTON 1, OHIO

THERE'S ONE RIGHT ANSWER IN ENGINEERING • • •



• • • AND IN DIESEL OIL FILTRATION

Whatever your Diesel filtration problem, WIX Engineering, Research and Development provide the right answer with slide-rule precision. For fuel or lube oil, yard engine or main line locomotive, varying operating or climatic conditions, WIX Oil Filter Cartridges stand out in quality and service.

WIX performs all manufacturing operations, carefully supervises every step from raw material to finished Product. Supported by extensive Laboratory facilities and constant field testing, and with the benefit of many years' experience in the railroad, automotive, industrial and marine fields, this is your guarantee of the utmost in filtration – efficiency and economy combined.

Tested WIX Filtrants keep oil cleaner for far longer periods. WIX Engineered Cartridge construction assures precise fit, ease of installation and extended service. And, WIX warehouse stocks provide convenient, immediate service.

Let WIX Engineering solve your filtration problems with Cartridges designed for the conditions under which your Diesels operate. Write for complete information today.

ENGINEERED FILTRATION

Selection of "Prescription" Filtrants: Cotton Threads, Blended Cotton Threads, Felted Paper.

Uniform volume, density packed in one-piece Sock. Integral End-Seal or Grip-Seal Cartridge construction.

Spring-reinforced center tube, slotted for greater, more even flow rates.

Tin-plated metal parts. Bale-type handles for easy installation and servicing.

ENGINEERED wix FILTRATION

WIX CORPORATION • • • • • GASTONIA • N • C

WAREHOUSES

GASTONIA · NEW YORK · SACRAMENTO
ATLANTA · DES MOINES · ST. LOUIS

Famous Problems IN RAILROADING

An express train leaves New York for Baltimore at the same time that a local train leaves Baltimore for New York. After they meet, it takes the express 1 hour to complete its trip while the local takes 3 hours. Just to complicate things, a second express leaves Baltimore for New York as soon as the first express reaches Baltimore.

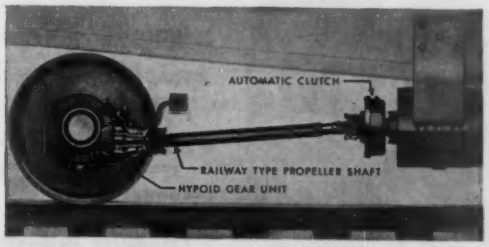
Assuming that all expresses travel at the same speed, and that any kind of train travels at a constant rate, which train reaches New York first — the local or the second express? By how many minutes? *See next month's Spicer Generator Drive advertisement for answer.*

SOLUTION TO LAST MONTH'S PROBLEM

By trial and error the most economical speed can readily be found to be between 22 and 23 m.p.h. Mathematically, if m = speed in m.p.h., then $20 + (m - 10)$ = operating cost per mile and $500\left(\frac{\frac{1000}{m} - 20}{1000}\right)$ = penalty cost per mile. Further, $(20 + (m - 10)) + 500\left(\frac{\frac{1000}{m} - 20}{1000}\right)$ = total cost per mile. Reducing we arrive at $\frac{m^2 + 500}{m}$ as cost per mile. This is a minimum when $m^2 = 500$, i.e. when $m = 22.36$.

Famous Solutions TO RAILROADING PROBLEMS

We have available for your use the valuable experience and knowledge gained in making over 10,000 Spicer Generator Drive installations all over the world.



Spicer Positive Railway Generator Drives can be quickly and economically adopted to new car designs and reconditioning jobs.

If you are concerned with the problem of efficiency in delivering steady, economical power to your electrical generator, let us show you how we have helped nearly a hundred different railroads all over the world.

The Spicer Railway Generator Drive consists of a very simple application of long-lived hypoid gear and pinion mounted on a standard axle. The drive from the gears is positive and constant through Spicer Universal Joints and Propeller Shaft to the Spicer Automatic Clutch mounted between the generator and the propeller shaft.

The correctness of Spicer design has been proved in millions of automotive power transmission installations made during the past 50 years. Let us show you how to secure economical, dependable generator drive service. Write for literature.

The Spicer Railway Generator Drive is manufactured, sold and serviced by

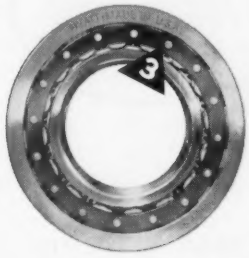
SPICER MANUFACTURING DIVISION
OF DANA CORPORATION
TOLEDO 1, OHIO

50 YEARS OF Spicer SERVICE
ENGINEERING DANA MANUFACTURING

LEADS THE WAY

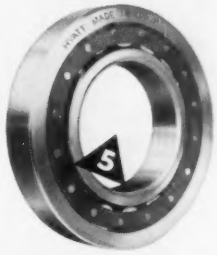
BEARING DESIGN

Will Keep Your Diesels On the Go!



New manufacturing process insures permanent rigidity of cage under operating stresses.

Cage and rollers remove as a unit, permitting complete and easy inspection of all operating surfaces.



Rings and bars of the new steel cage are treated to give the new bearing greater wear resistance.

Just a year ago we announced the new Hyatt pinion-end bearing for traction motor armature shafts. It was, and still is, *the first pinion-end bearing available with the combined advantages of a roller-riding cage design and maximum capacity rollers!* Hyatt's new design eliminates rubbing contact between the cage and stationary race flanges and permits improved flow of lubricant to all parts of the bearing. Rings and bars of the new steel cage are specially treated for greater resistance to wear, and a new assembly process assures permanent rigidity of the cage under operating stresses. Cage bars conform to the shape of the rollers, and cage and rollers remove as a unit—permitting complete and easy inspection. The result is an easily-inspected bearing with far greater life expectancy. It will pay you to make sure *your* diesels are *Hyatt-equipped!* Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

FOR TRACTION MOTOR ARMATURE SHAFTS

HYATT

STRAIGHT ROLLER BARREL ROLLER TAPER ROLLER

Something to keep in mind . . .

Maintenance costs take a nose dive when diesel engines are equipped with solid aluminum bearings!

Over one hundred aluminum half-shells in each engine! That's how Fairbanks-Morse feel about aluminum bearings. They tested many different types of bearings but settled on solid aluminum because of the many proven advantages of this material.

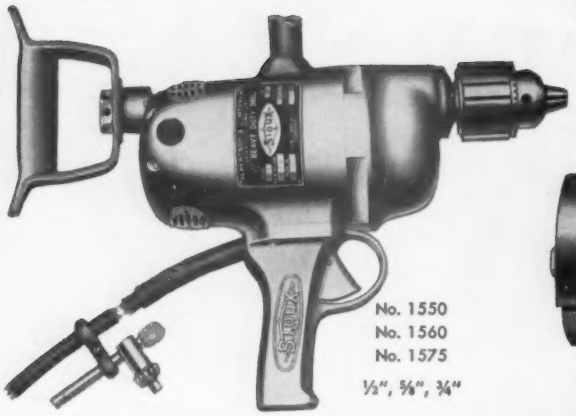
With Alcoa® Aluminum Bearings, their earlier model diesel engines were giving many times longer life with less down-time. Maintenance costs literally "nose-dived". That's why they specify a full engine set of these bearings in their great new *Train Master* Locomotive! Fifty-two bearings (one hundred four half-shells), including mains, connecting rods and thrust bearings are all Alcoa Aluminum!

These bearings last longer because they move heat fast—eliminate hot spots. They offer the ultimate in corrosion resistance and have extremely high load-carrying ability. They are solid bearing metal all the way through so there are no hard backings to score expensive shafts. For the whole story on this NEW way to slash rising maintenance costs, write: ALUMINUM COMPANY OF AMERICA, 1986-D Alcoa Bldg., Pittsburgh 19, Pa.

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

ALCOA ON TV brings the world to your armchair with "SEE IT NOW" featuring Edward R. Murrow, Tuesday evenings on most CBS-TV stations.



No. 1550
No. 1560
No. 1575
½", ⅜", ¾"

ELECTRIC DRILLS

Advanced Design
Balanced Power
Rugged Construction
A Size for Every Need
Sioux Dependability
No Drill is Built to Last Longer

PORTABLE GRINDERS

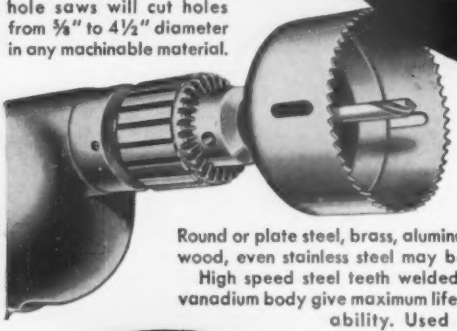
A Dependable, Heavy Duty Tool for Grinding, Buffing, Wire Brushing.
5" and 6" Wheel Diameters.
Carefully Balanced for Easy Handling.
Sioux Quality Throughout

SIOUX TOOLS

STANDARD THE WORLD OVER!

HIGH SPEED HOLE SAWS

Sioux high speed teeth hole saws will cut holes from ⅜" to 4½" diameter in any machinable material.



Round or plate steel, brass, aluminum, bronze, wood, even stainless steel may be cut.

High speed steel teeth welded to chrome vanadium body give maximum life and cutting ability. Used in electric drills, drill press, or lathe.

WIRE WHEEL BRUSHES

Durably built of special brushing wire with wide face, even trim, perfect balance. Designed for heavy duty cleaning, removing, deburring, descaling, roughing, buffing, and polishing.

Torque or saucer shaped brushes are fast workers for body repair, removing paint, scale or corrosion, cleaning welded joints, etc, Used with Sioux flexible shafts or portable. tools the broad brushing area cleans large areas in less time.

SIOUX

USE SIOUX ALL THE WAY THROUGH

SOLD ONLY THROUGH AUTHORIZED DISTRIBUTORS

ALBERTSON and CO., INC.
SIOUX CITY, IOWA, U.S.A.

ELECTRIC DRILLS, SANDERS, POLISHERS, BENCH GRINDERS, ABRASIVE DISCS, PORTABLE GRINDERS, ELECTRIC HAND SAWS, FLEXIBLE SHAFTS.


To make vacationing
in CANADA
even more wonderful
141
new passenger cars
built by
PULLMAN-STANDARD
for
CANADIAN
NATIONAL
RAILWAYS

CANADIAN NATIONAL RAILWAYS

"NEW STANDARDS OF COMFORT NEW PLATEAUS OF PLEASURE"

The C. N. R. is changing "travelling" into "travel living"—all over the system, including the Grand Trunk Western. The new, smooth riding, beautifully outfitted, modern, comfortable cars will be in operation by the time the vacation traffic reaches its peak. Every principal train on the system will have been provided with its share of new equipment.

The vanguard of the 141 new Canadian National passenger cars, built by **PULLMAN-STANDARD,** reached the Montreal yards in January, on schedule. All of the new cars are being delivered, on schedule, at the rate of five per week.

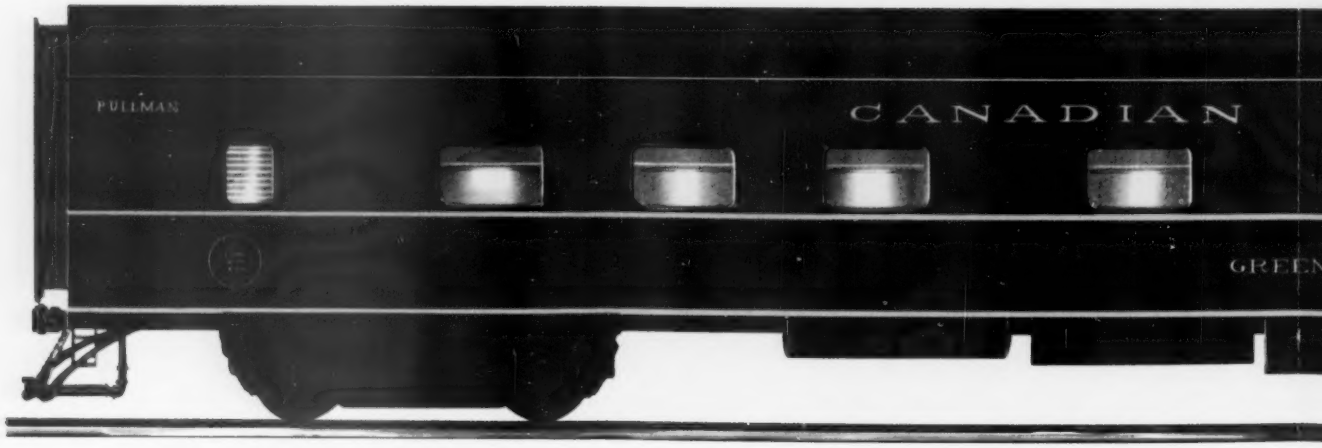
The sleeping cars are made up of various combinations of Pullman-Standard "S" type accommodations. Of the total, 52 cars have *four* sections, *eight* duplex roomettes, and *four* double bedrooms; 20 cars have *six* roomettes, *four* double bedrooms, *six* sections; 6 cars have *ten* roomettes and *five* double bedrooms; 6 cars have *five* compartments and *three* drawing rooms.

A new departure in *meal service* is provided by 6 dinette cars, offering counter service for twenty-six persons at a sitting. Other dining and lounge accommodations are provided by: 4 sleeper-grill cars (eight sections, one double bedroom and a sixteen chair dining room), 6 buffet-sleepers (ten sections, one double bedroom), 8 buffet-lounge cars (two double bedrooms, two compartments), 2 buffet-lounge cars (seven compartments), 9 parlor-grill cars, 2 buffet-parlor cars, 6 parlor cars and 14 diners.


how travelling becomes "Travel Living" for Canadian National patrons

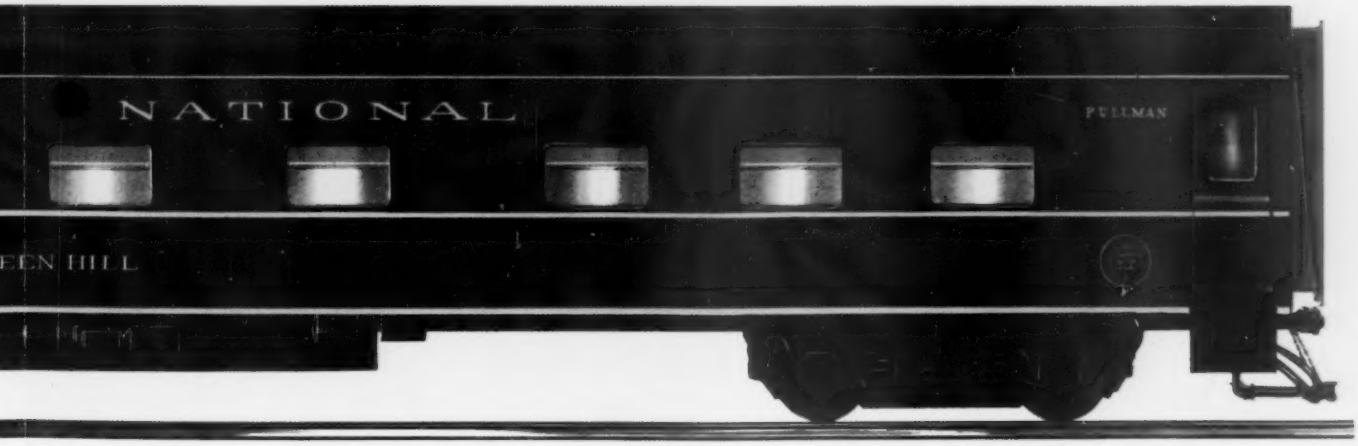
The sections, located at the end of the car, have easy-riding foam rubber cushioning. Each seat is wide enough to accommodate two people comfortably. The improved folding arrangement assures ample leg room between the seats. For night use a patented folding ladder is attached to each upper berth permitting easy access and exit, even without the assistance of a porter.

The Roomette and duplex roomette, for single occupancy, have new conveniences. In the roomette, the folding bed, narrowed at the foot end, can be lowered or raised with the door closed. Finger-tip control, with the *Pullman-Standard* counter-balance mechanism makes operation easy and convenient. Individually controlled heat and air conditioning add to the comfort of the individual passengers.



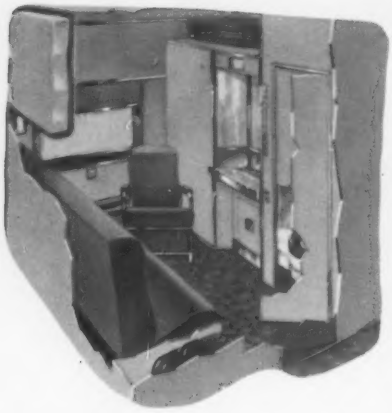
In the "S" type double bedrooms, berths completely disappear and two comfortable folding arm chairs are provided for daytime use. Maximum privacy is assured by enclosed toilet. It is separated from wash basin permitting individual use of each. As illustrated on the preceding fold, an en suite arrangement is made possible by folding the rigid, sound-deadened partition.

The car plans for "S" type accommodations are such that groups of units can be arranged in virtually any desired combination without requiring major engineering or manufacturing changes. The unlimited possibilities in fabrics and paint colors and in individual accessories permit a variety of decorative treatments for any degree of luxury, from the sections to the drawing rooms.

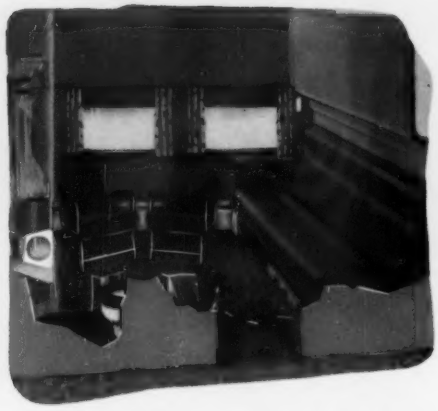


ONE OF THE 141 NEW CANADIAN NATIONAL PASSENGER CARS BUILT BY PULLMAN-STANDARD

PS



The compartments have a convertible sofa, upper berth, folding chair, enclosed toilet facilities.

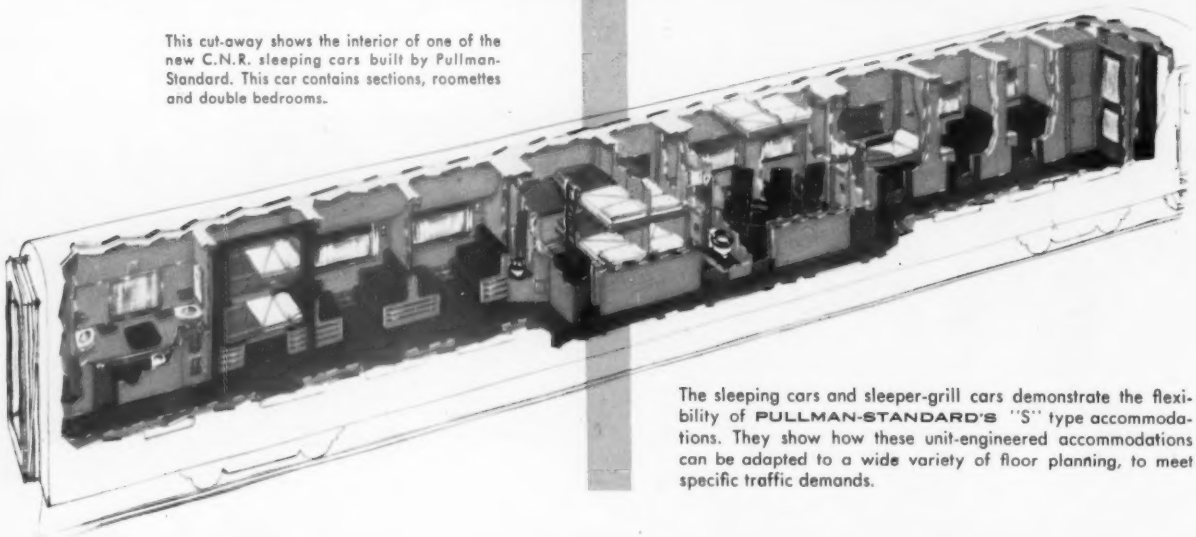


The beautiful drawing rooms provide spaciousness by day—restful comfort by night.

Attractive dinettes provide comfortable seating for twenty-six persons along a gleaming counter.

Tastefully appointed buffet and grill combination cars combine travelling comfort, dining facilities.

This cut-away shows the interior of one of the new C.N.R. sleeping cars built by Pullman-Standard. This car contains sections, roomettes and double bedrooms.



The sleeping cars and sleeper-grill cars demonstrate the flexibility of PULLMAN-STANDARD'S "S" type accommodations. They show how these unit-engineered accommodations can be adapted to a wide variety of floor planning, to meet specific traffic demands.

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

79 EAST ADAMS STREET, CHICAGO 3, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON

Printed in U. S. A. A-9062

the inside story of the chilled car wheel

a 10-year record of improved values

1941-1946 Improved Control of mottled iron formation, providing clearer chill at tread and more impact resistant gray iron backing.

1945 AMCCW plants adopt limitation on chill depth in rim.

1945 Rim thickness increased.

1947 More rigid inspection and standards for rotundity adopted for wheels shipped from AMCCW plants.

1950 New wheel design features heavier tread (stronger flange and rim) and more brackets (thicker, heavier, more continuous flange support).

1951 New wheel design advanced from "Recommended Practice" to "AAR standard."

In good supply • Available locally
Short-haul delivery • Reduced inventory
Low first cost • Low exchange cost
Increased ton mileage • High safety standards
AMCCW plant inspection • Easier shop handling

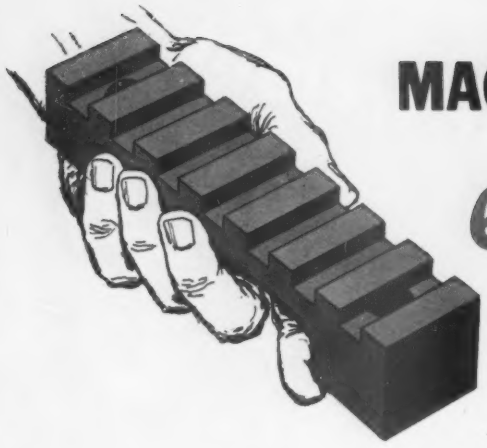
Quick, low-cost delivery of chilled car wheels from the AMCCW plant near you.

AMCCW

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS

445 North Sacramento Boulevard, Chicago 12, Ill.

Albany Car Wheel Co. • American Car & Foundry Co. • Griffin Wheel Co.
Marshall Car Wheel & Foundry Co.
Pullman-Standard Car Mfg. Co. • Southern Wheel (American Brake Shoe Co.)



MAGNUS R-S JOURNAL STOP eliminates biggest

This new development prevents excessive axle displacement under braking and impact forces—eliminates waste grabs, adds life to bearings, keeps packing in place, and cuts down man hours for car servicing.

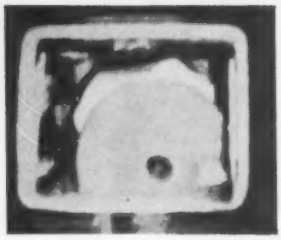
From a purely mechanical standpoint — what's the biggest single cause of hot boxes? The answer is truck design — loose, nominal-dimension construction that permits virtually unrestricted axle movement fore and aft within the journal box. The result: whenever there's a heavy brake application, or a heavy impact during road or switching operations, the axle rolls right out from under the bearing — cocks both bearing and wedge out of position. The packing is displaced, too — often gets trapped under the bearing crown. And linings are spread because of the concentrated uneven loading.

The new Magnus R-S Journal Stops for standard integral cast boxes prevent all that — virtually eliminate waste grabs and spread linings due to concentrated loading. Made of bronze bearing metal, they keep the bearing and wedge in place *under all conditions*, let the bearing take the load in the crown where it should. If you put the bearings in right, they stay right. Journal Stops keep the packing in place, too. Can cut down time-consuming adjustment at servicing points — may speed up departure times.

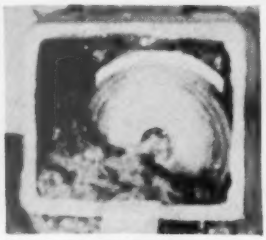
R-S Journal Stops have been in test service for more than a year and a half. During that time there has been only slight wear on the Journal Stops and *there have been no hot boxes!* All bearings removed for inspection after 18 months were returned to service. In addition, it was found that there was substantially less than normal wheel flange wear, and the wear uniform on all wheels. This could mean very important savings in terms of extended wheel life alone.

Be sure to get your free copy of our Bulletin 1002 describing the new Magnus R-S Journal Stop and Packing Retainer. Just write a post card or letter to Magnus Metal Corporation, 111 Broadway, New York 6; or 80 East Jackson Blvd., Chicago 4.

This CAN'T HAPPEN when you use the R-S Journal Stop

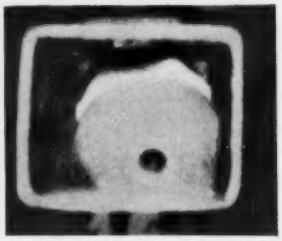


High-speed photo showing axle and bearing displacement at 11.5 mph impact.



Still shot shows packing condition after 450 mile run with no switching or humping involved.

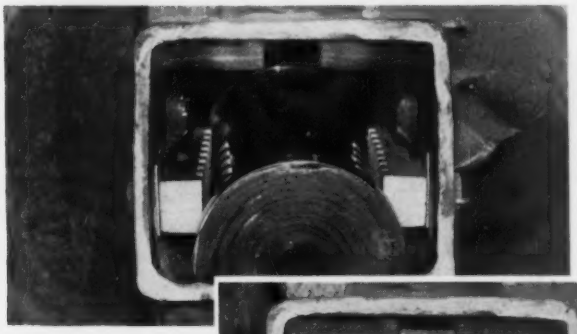
Another example of displaced packing after 450 mile run.

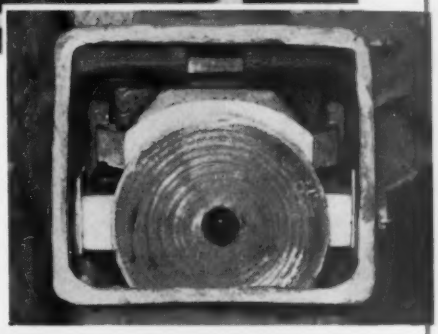


High-speed photo of incipient waste grab at impact of 7.7 mph.

and PACKING RETAINER

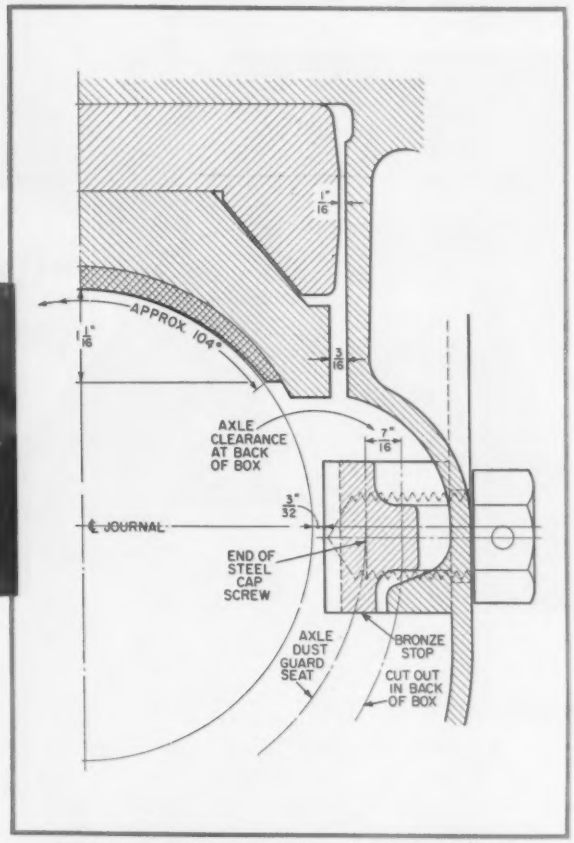
single cause of hot boxes!





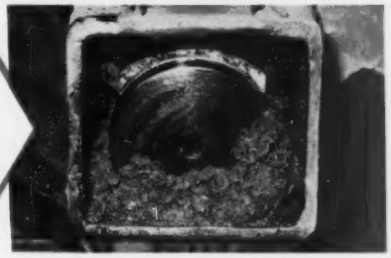
Above: Jacked journal box with packing, bearing and wedge removed, showing mounting of Journal Stops on inside walls of box.

Right: Journal box with wedge and bearing in place (no packing), showing Journal Stops and car journal in operating position.



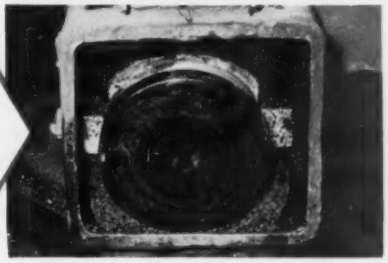
Cross-section of Magnus R-S Journal Stop as applied to 5½-in. x 10-in. journals. Regardless of journal size, the bronze journal stop is 2½-in. shorter than journal length. Bearing and wedge can be taken out for inspection without removing Journal Stops. Only one Journal Stop need be removed from each box to remove side frames.

NO STOPS



Here's what happened to the packing in a journal box after flat-switching impact at 11½ mph. Packing badly displaced.

WITH STOPS



Here's a box on the same car fitted with Journal Stops after undergoing same 11½ mph impact test. Packing is still in its proper position.

MAGNUS

Solid Bearings

Right for Railroads

...in performance...in cost

MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**

The B & O Railroad knows "good housekeeping" PAYS OFF!

Wyandotte "research-developed" cleaners *SAVE MONEY HERE!*

B&O Air Blower before and after cleaning with a Wyandotte specialized product. Photos by Theodore Brinkmann, Technical photographer for the B&O Railroad.

EVERY PART SAFELY, EFFECTIVELY, ECONOMICALLY CLEANED

A Wyandotte specialized cleaner for aluminum, and other light metals which have to be protected, cleans air blowers like this better and at lower use-cost for the B&O Railroad.

The results shown are typical of those demanded by high cleaning standards of the B & O Railroad. This Wyandotte cleaner is a potent detergent, 100% soluble, rinses freely, and meets the stringent aluminum corrosion requirements of government specifications MIL-C-5543 and AAF-14128A, and the magnesium corrosion requirements of AXS-1849.

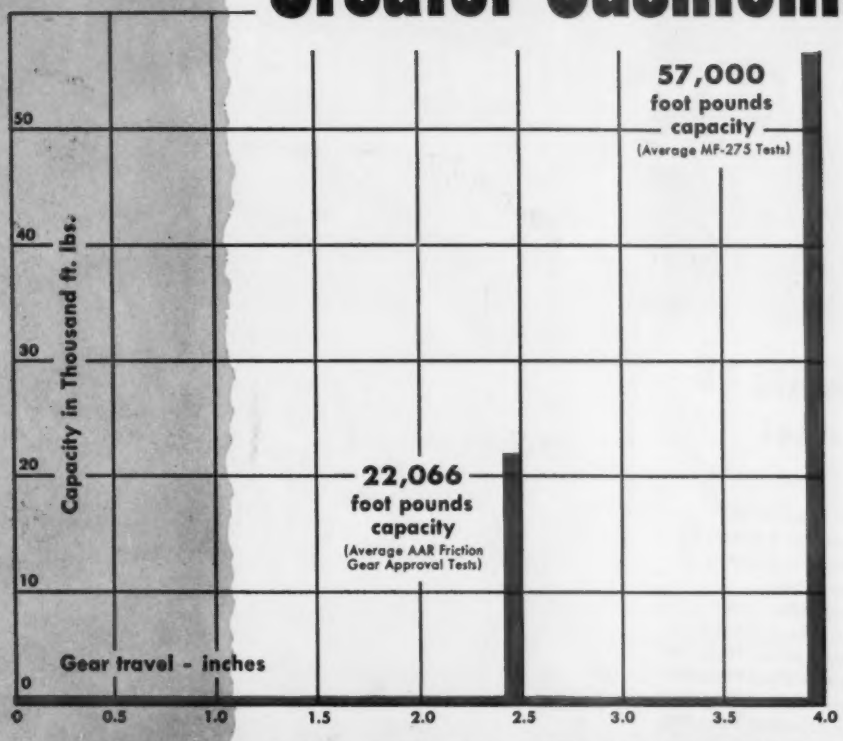
Wyandotte makes specialized railroad products for all cleaning operations on Diesel and steam locomotives and passenger, freight, tank and refrigerator cars; for heavy-duty vat cleaning; for absorbing oil and grease on floors; and for paint stripping. All offer you *high quality* and *low use-costs*. They are made and guaranteed by Wyandotte, the world's largest manufacturers of specialized cleaning products for business and industry. A Wyandotte representative will help you apply them to your needs in the most profitable manner. Write us now. *Wyandotte Chemicals Corporation, Wyandotte, Mich. Also Los Angeles 12, Calif.*

Wyandotte CHEMICALS

Helpful service representatives in 138 cities in the United States and Canada

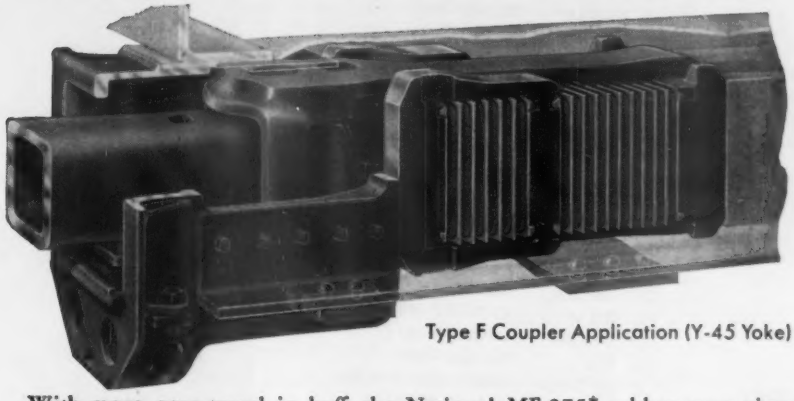
Largest manufacturer of specialized cleaning products for business and industry

Greater Cushioning Capacity



through longer travel

NATIONAL Multi-Pad Rubber Draft Gear



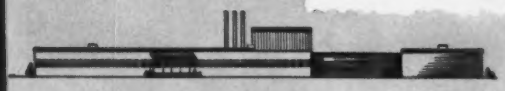
Type F Coupler Application (Y-45 Yoke)

With more gear travel in buff, the National MF-275* rubber gear gives greater cushioning capacity — *where it counts* — than certified friction gears. Tests have shown 57,000 foot-pounds capacity at the 4-inch travel mark.

Which all adds up to delivery of undamaged lading for increased customer good will — and dollars saved in damage claims and car maintenance! A-9004

Fits Standard AAR yokes and standard car construction with no slack in yoke or pocket!

Technical Center
Cleveland



*AAR Certified

"Progress through Research"

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY
Cleveland 6, Ohio

COUPLERS • YOKES • FREIGHT TRUCKS • DRAFT GEARS—RUBBER AND FRICTION
JOURNAL BOXES AND LIDS

180,000 freight cars have been built

1952-53 freight car orders using USS COR-TEN steel

DOMESTIC	NO.	TYPE	BUILDER
Atchison, Topeka & Santa Fe	500	Gondola	Pressed Steel Car Co.
Chesapeake & Ohio	1000	Hopper	American Car & Foundry Co.
Chesapeake & Ohio	300	Gondola	American Car & Foundry Co.
Chesapeake & Ohio	1900	Hopper*	Company Shops
Chesapeake & Ohio	450	Gondola*	Company Shops
Delaware, Lackawanna & Western	500	Hopper	American Car & Foundry Co.
Denver & Rio Grande Western	1700	Gondola	General American Trans. Corp.
General American Transportation	600	Refrigerator	General American Trans. Corp.
General American Transportation	110	Cov. Hopper	General American Trans. Corp.
General American Transportation	1000	Refrigerator	General American Trans. Corp.
Great Northern	500	Box	Company Shops
Illinois Terminal	100	Hopper	Pressed Steel Car Co.
Norfolk & Western	300	Hopper	Company Shops
Norfolk & Western	300	Hopper	Company Shops
Norfolk & Western	1000	Gondola	Company Shops
Norfolk & Western	345	Hopper*	Company Shops
Orinoco Mining Company	560	Ore	Magor Car Corporation
St. Louis Refrigerator Car Co.	300	Refrigerator	Pressed Steel Car Co.
St. Louis, San Francisco	300	Gondola	Pullman-Standard Car Mfg. Co.
St. Louis, San Francisco	300	Hopper	Pullman-Standard Car Mfg. Co.
Seaboard Air Line	400	Cov. Hopper	American Car & Foundry Co.
Southern Pacific	1500	Box	Southern Pacific Equipment Co.
Southern Pacific	1000	Box	Southern Pacific Equipment Co.
Southern Pacific	1400	Box	Southern Pacific Equipment Co.
Southern Pacific	350	Gondola	Southern Pacific Equipment Co.
Southern Pacific	1600	Box	Pullman-Standard Car Mfg. Co.
Southern Pacific	1000	Auto Box	Southern Pacific Equipment Co.
Southern Pacific	250	Box	Southern Pacific Equipment Co.
Southern Pacific	500	Auto Box	Company Shops
Union Pacific	500	Box	Company Shops
Union Pacific	12	Air Dump	Baldwin-Lima-Hamilton
U.S. Steel, Fairless Works	314	Hopper	Company Shops
Virginian	300	Gondola	General American Trans. Corp.
Western Pacific			
FOREIGN			
Canadian National	1400	Box	National Steel Car Co.
Canadian National	200	Cov. Hopper	Marine Industries, Ltd.
Canadian Pacific	100	Cov. Hopper	National Steel Car Co.
Canadian Pacific	150	Refrigerator	National Steel Car Co.
Canadian Pacific	500	Gondola	Eastern Car Co.
Mozambique Railways (Portuguese East Africa)	398	Gondola	Magor Car Corporation
Sydney & Louisburg	200	Hopper*	Eastern Car Co.
Union Miniere (Belgian Congo)	30	Air Dump	Baldwin-Lima-Hamilton
Union Miniere	24	Air Dump	Baldwin-Lima-Hamilton

*Rebuilt

1933 UNITED STATES STEEL USS HIGH STRENGTH STEELS 1953

TWENTY YEARS OF PERFORMANCE

USS HIGH STRENGTH STEEL

better with USS COR-TEN steel since 1933

IN THE LAST TWO YEARS, ORDERS HAVE BEEN PLACED FOR

22,000 freight cars

built with USS COR-TEN steel

● Look at this long list of recent orders for freight cars built with USS COR-TEN steel. Twenty-two railroads and other car users are represented here. Only four of them are using COR-TEN steel construction for the first time. The rest have had years of experience with equipment made of COR-TEN steel.

For example, the Chesapeake & Ohio, Seaboard Air Line and Union Pacific have been cutting operating and upkeep costs with COR-TEN steel cars for as long as 20 years. Among the first to put this superior steel to work, these three railroads have from time to time, since 1934, added to their original COR-TEN steel equipment and among them have now in service a total of over 32,000 cars of COR-TEN steel construction.

Their experience is typical. In other words, most of the orders now being placed for COR-TEN steel cars are *repeat* orders.

We emphasize this because it highlights the important fact that COR-TEN steel construction is bought again and again. And for good reason. Many years of superior service performance have proved that the high strength and high corrosion resistance of COR-TEN steel pay off in substantially reduced maintenance costs.

Today, many of the major railroads in America have considerable numbers of USS COR-TEN steel cars on their lines. In fact, more than 180,000 of these money-saving cars are now in service.

So satisfactory has been the performance of this equipment that not only here, but in Canada, in South and Central America and even in Africa, among cost-conscious railroad men, COR-TEN steel construction has come to mean "The best in freight car equipment."

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

4-698

UNITED STATES STEEL

If you make any parts like these....

- Piston Pins
- Pump Cylinders
- Axles (front and rear)
- Bearing (Races)
- Airbrake Parts
- Drag Links
- Table Rollers
- Exhaust Lines
- Drill Shanks
- Frame Spacers
- Grease Guns
- Armature Bodies
- Hydraulic Brake Lines
- Filler Tubes
- Hydraulic Hoist Cylinders
- Ignition Wire Tubes
- Radio Parts
- Bushings
- Jacks
- Gun Barrel Drills
- Axle Housings
- Propeller Shafts
- Bobbins
- Push Rods
- Rocker-Arm Shafts
- Hollow Spindles
- Shock-Absorber Casings
- Spring Bushings
- Ironer Rolls
- Tie Rods
- Drill Collars
- Torque Tubes
- Spool Holders
- Golf Shafts
- Transmission Parts
- Spindle Caps

you can make them

better, faster and at less cost

with SHELBY SEAMLESS STEEL TUBING

BECAUSE Shelby Seamless comes to you with the basic shape and hole already made you can eliminate or greatly reduce many time and labor-consuming operations connected with boring and machining. You also save the wear and tear on expensive tools, as well as the needless waste of steel.

Another important advantage in using Shelby Seamless Tubing is that its excellent machining characteristics and uniformity speed up production and improve the quality of your output. *You can turn out parts by the millions and the last part will be as metallurgically and dimensionally accurate as the first part produced.*

Shelby Seamless Steel Tubing is available in a complete range of sizes; in different wall thicknesses; various finishes and steel analyses. Our engineers will be glad to submit recommendations based on a study of your particular requirements.

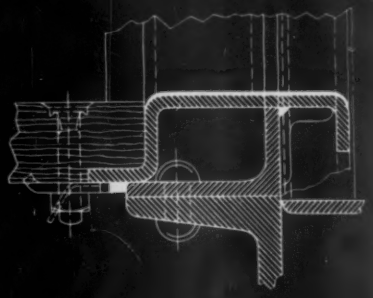
All Shelby Seamless Tubing is pierced from solid billets of uniform steel. This is the one manufacturing method that assures absolute uniform wall strength.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S SHELBY SEAMLESS MECHANICAL TUBING

USS

UNITED STATES STEEL



an MF car is a Maintenance-Free car

M-F THRESHOLD PLATES

STRENGTHEN THE DOORWAY

PERMIT EASY FLOOR BOARD REMOVAL

MAC LEAN-FOGG LOCK NUT COMPANY

5535 North Wolcott Avenue, Chicago 40, Illinois · In Canada: The Holden Co., Ltd., Montreal

LUBRICANT-TM

Since its introduction in 1952, Sinclair JET Lubricant—TM has reached that acme of acceptance where it is now being used by many of the nation's most prominent railroads. The emblems shown represent only part of the total number of railroads using this All-Year Lubricant. Actually, *more than 70 railroads are using* JET Lubricant—TM. Isn't it time you, too, investigated the advantages of this top quality railroad lubricant?

Contact Sinclair Refining Company,
Railway Sales
New York, Chicago, St. Louis, Houston

SINCLAIR RAILROAD LUBRICANTS

HUMPTY DUMPTY GETS A SMOOTH RIDE

in freight cars cushioned with "RAILWAY" SPRINGS

Profit-wise carriers help guard against damaged lading and resulting claims by specifying "Railway" long travel, coil springs for their cars. These freight-cushioning springs also assure longer life for rolling stock and reduced roadbed maintenance costs.

Smooth the way for your freight loads and profits by specifying rugged, long travel "Railway" springs . . . products of one of America's oldest spring manufacturers. Just call in your Alco sales representative for complete information.

RAILWAY STEEL-SPRING DIVISION

AMERICAN LOCOMOTIVE COMPANY

NEW YORK • CLEVELAND • CHICAGO
RICHMOND • ST. LOUIS • ST. PAUL
SAN FRANCISCO

For high standards of performance

you can rely on EDISON

DEPENDABLE POWER has always been a major characteristic of EDISON batteries in meeting today's heavy passenger-train demands for air-conditioning, car-lighting and growing electrical service needs.

ELECTRICALLY FOOLPROOF, EDISON batteries can safely be maintained in a high state of charge thus reducing the need for yard charging. They have no prescribed discharge limits thus increasing the effective operating reserve, especially when self-regulating inversion equipment is employed.

MOST ECONOMICAL, TOO—as the operating records of America's both large and small roads bear out. For example, on many roads, EDISON batteries have given an average service life of *18 to 25 years.*

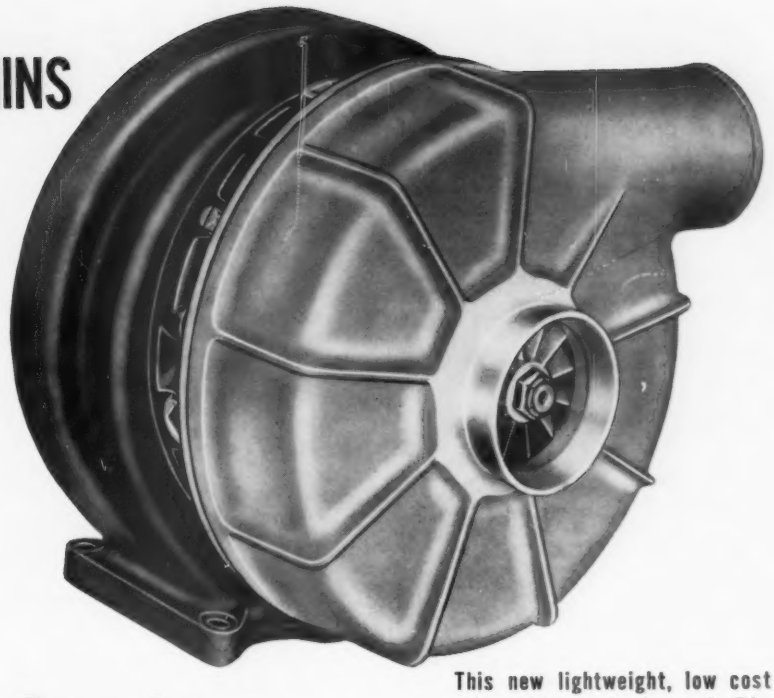
There are more reasons why EDISON batteries enjoy railroad preference—all-steel cell container and plate design provides rugged stamina for typical railroad operations . . . this same EDISON steel cell construction reduces weight—up to 2000 pounds per car . . . and EDISON batteries successfully meet temperature extremes; withstand the overcharging and overdischarging often incidental to railway car service. Before selecting your next passenger car battery, be sure you have the latest, proven facts on EDISON battery operation . . . write today for Bulletin SB 3208 and the name of your nearest Edison Field Engineer. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.

Most Dependable Power—
Lowest Over-all Cost
...you get both with an EDISON

EDISON
Nickel · Iron · Alkaline
STORAGE BATTERIES

EDISON ALSO MAKES THE FAMOUS "V.P." VOICEWRITER AND THE TELEVOICE SYSTEM

SCHWITZER-CUMMINS New Turbo Charger Shows How



This new lightweight, low cost exhaust driven turbo charger, for Diesel engines in the 100-200 hp range, is produced by Schwitzer-Cummins Co., Indianapolis, Ind.

Ni-Resist Defeats Corrosion... Erosion... Heat

Schwitzer-Cummins Company, for 25 years a leading builder of gear and belt driven automotive superchargers, is now producing this new exhaust driven lightweight turbo charger.

Original specifications called for a gray iron housing. But Schwitzer-Cummins engineers found in practice that unalloyed cast iron failed in this application because hot exhaust gases were causing abnormally high temperatures.

So, they tried Ni-Resist®...

And the result? No failures. None... from scale, cracking or any other cause.

Now, Ni-Resist housings are specified to assure:

1. Resistance to corrosion and erosion by combustion products of chemically treated fuels.
2. Heat resistance up to 1400°F.
3. Good machinability, cutting unit cost.

Other important characteristics of Ni-Resist are selected expansivities, and wear resistance in metal-to-metal service. In fact, *no other cast metal provides such a useful combination of engineering properties.*

In truck, bus, locomotive, marine and stationary power plant engines... in reciprocating aeronautical engines... Ni-Resist has application in exhaust valve guides, aluminum piston ring bands, cylinder liners, exhaust manifolds, connector rings, exhaust seat rings and ball joints and in water pump impellers and bodies.

Several types of Ni-Resist are available to meet a variety of industrial demands. Get full information... mail the coupon now.

The International Nickel Company, Inc.
Dept. 20, 67 Wall Street, New York 5, N. Y.

Please send me booklets entitled "Engineering Properties and Applications of Ni-Resist" and "Buyers' Guide for Ni-Resist Castings."

Name _____ Title _____

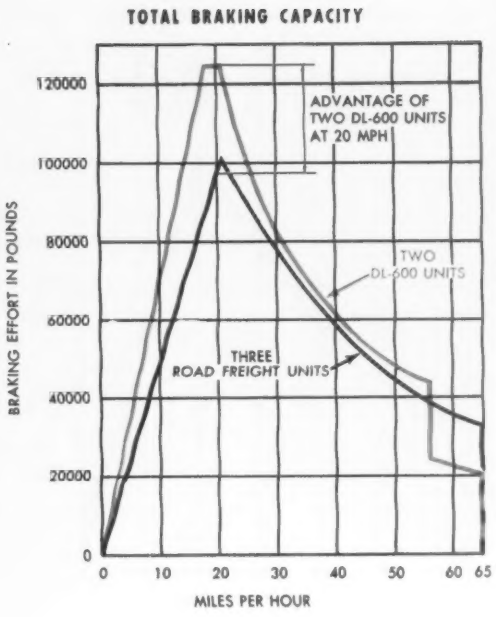
Company _____

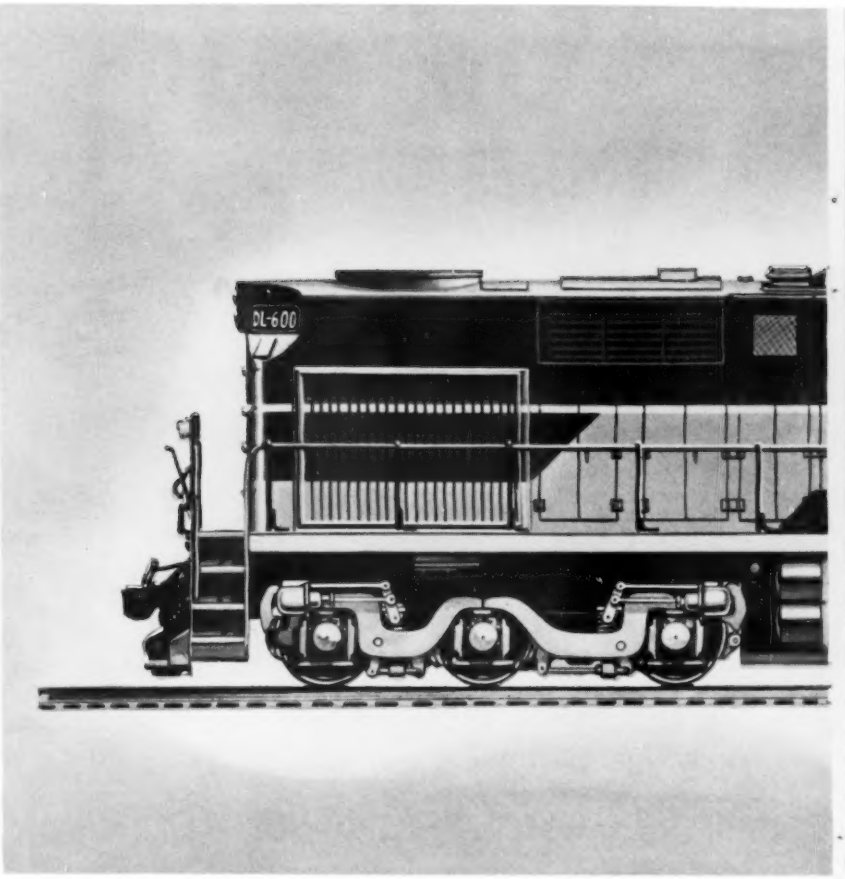
Address _____

City _____ State _____

EMBLEM OF INCO SERVICE

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.





New, All-Purpose

offers highest continuous and short-time tractive ratings— for more speed, power, versatility *at less cost*

The new Alco DL-600, *the most versatile locomotive ever built*, produces at 65-mph gearing the highest continuous tractive effort—79,500 lb—and the highest short-time tractive effort of any diesel electric on the rails today.

Thus in every type of service—high-speed freight and passenger, heavy-duty switching and transfer, mine haul, and humping—the new DL-600 hauls present tonnages at *higher* speeds and *heavier* tonnages at present speeds, *all at lower cost*.

This latest development in modern motive power has the improved Model 244 16-cylinder V-type Alco engine . . . a single unit, using one generator, one electrical system . . . conservatively rated at 2250 hp and with all parts interchangeable with other Alco locomotive engines.

"2-for-3" Advantages of New DL-600 Open Whole New Field for Railroad Savings

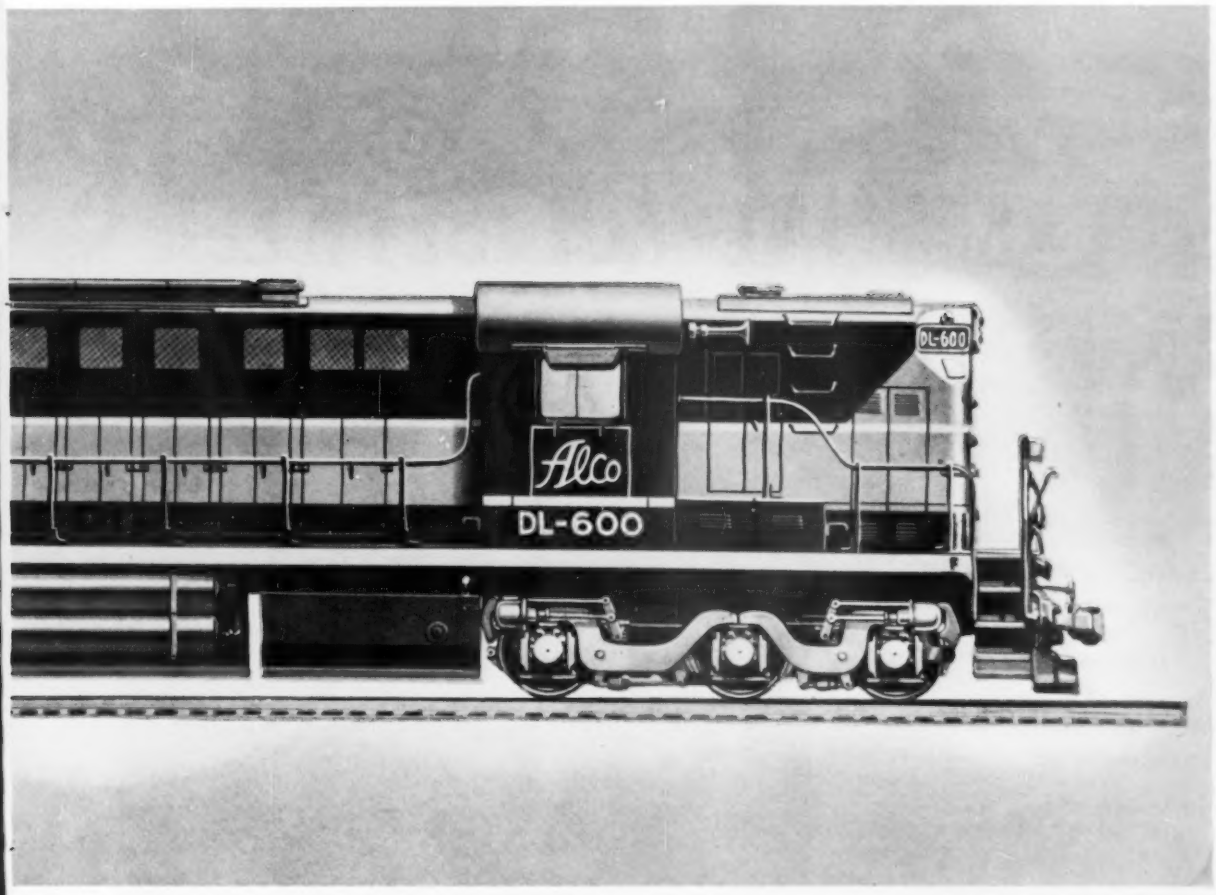
With unmatched speed, power, versatility, *two* DL-600's will normally do what *three* 4-motor units will do . . . *with these advantages:*

- **TWO UNITS TO BUY INSTEAD OF THREE**
- **TWO UNITS TO OPERATE INSTEAD OF THREE**
- **TWO UNITS TO MAINTAIN INSTEAD OF THREE**
- **PLUS: Higher continuous tractive effort**
  25% more dynamic braking effort
  15% shorter length
  Same number of traction motors (12) in only 4 trucks

The new DL-600 also offers 1) the greater flexibility of all-purpose design; 2) interchangeability of components with other Alco locomotive engines; and 3) *the world's most powerful dynamic braking*.

Alco

AMERICAN



"2-for-3" Locomotive

More Braking Power at All Speeds

At most speeds the new DL-600 exerts approximately 75 per cent more dynamic braking effort than a standard freight unit of any other manufacturer.

At speeds from 18 to 65 mph the DL-600 exerts more dynamic braking effort than any other diesel electric ever built. At 50 mph, for example—where capacity on some diesel electrics may drop to zero—a single DL-600 still has an available braking effort of 24,300 lb.

Proved Components

Remember, too: all main components of the new DL-600 have been *proved in service*. The Model 244 engine—with new water-cooled turbosupercharger system and new hardened crankshaft—is on the job today in Alco locomotives the world over. The traction motors are the same rugged, high-output motors installed on all Alco road locomotives. And the three-motor trucks—with all motors readily accessible for servicing—are based on 12 years' design and operating experience.

For complete details on the new DL-600—latest example of Alco's *better motive power for greater earning power*—contact your nearest Alco locomotive representative.

ROOMINESS, excellent visibility, low noise level of DL-600 cab add up to greater comfort and safety for operating crew.

LOCOMOTIVE COMPANY

Sales and Service Offices in Principal Cities

Newer, more positive method of flange lubrication

INCREASES MILEAGE BETWEEN WHEEL TURNINGS up to 40%

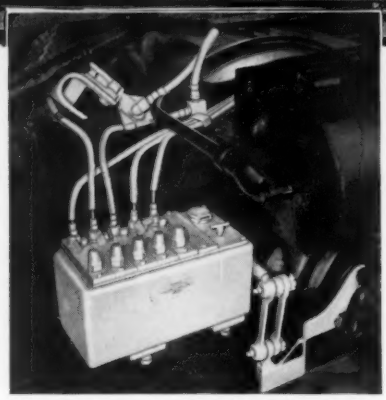
. . . reduces rail wear, too!

MAGNUS D-16 FLANGE LUBRICATOR

offers all these important features

- *Positive, controlled-pressure flange lubrication*
- *Six individually-adjustable pumps*
- *Also lubricates Center Pin Wear Plate*
- *Operates only when locomotive is moving*
- *No over-run on treads*
- *Sixteen pint capacity*

Recommended installation consists of one Magnus Type D-16 Flange Lubricator for each locomotive truck—using four outlets to lubricate all flanges and one outlet for center pin wear plate lubrication. With this arrangement, road locomotives can average over 1,000 miles and yard locomotives can operate six days without oil additions.



Close-up view of the above installation, showing D-16 Flange Lubricator mounted on truck frame, and connecting mechanical linkage to journal box. Flange head assembly and mounting bracket are visible at top left. Any movement of ¼" or more of truck frame with respect to wheels operates the ratchet drive of the lubricator and actuates all high pressure pumping units. Oil is delivered through copper tubing and flexible hose to Flange Head Assemblies—mounted at a 45° angle to wheel centers.

Equip your diesels with new Magnus Type D-16 Flange Lubricators and you extend mileage between wheel turnings up to 40%. Cut flanges of locomotives already in service smooth out quickly—in the first few hundred miles. Flanges of new locomotives stay smooth—won't cut or chafe. You save plenty on shop expense and "down time"—and you save on longer wheel life, too.

Each precision pump is individually adjustable with a single set screw. This means positive control of the amount of oil to each outlet point—makes it possible to provide maximum protection for flanges yet prevent oil from reaching the wheel treads. You also can deliver a smaller quantity of oil for positive center pin wear plate lubrication.

Write for complete information.

Magnus Brass
Manufacturing Company
Subsidiary of **NATIONAL LEAD COMPANY**
525 Reading Road, Cincinnati 2, Ohio

other Magnus Brass products for diesel locomotives

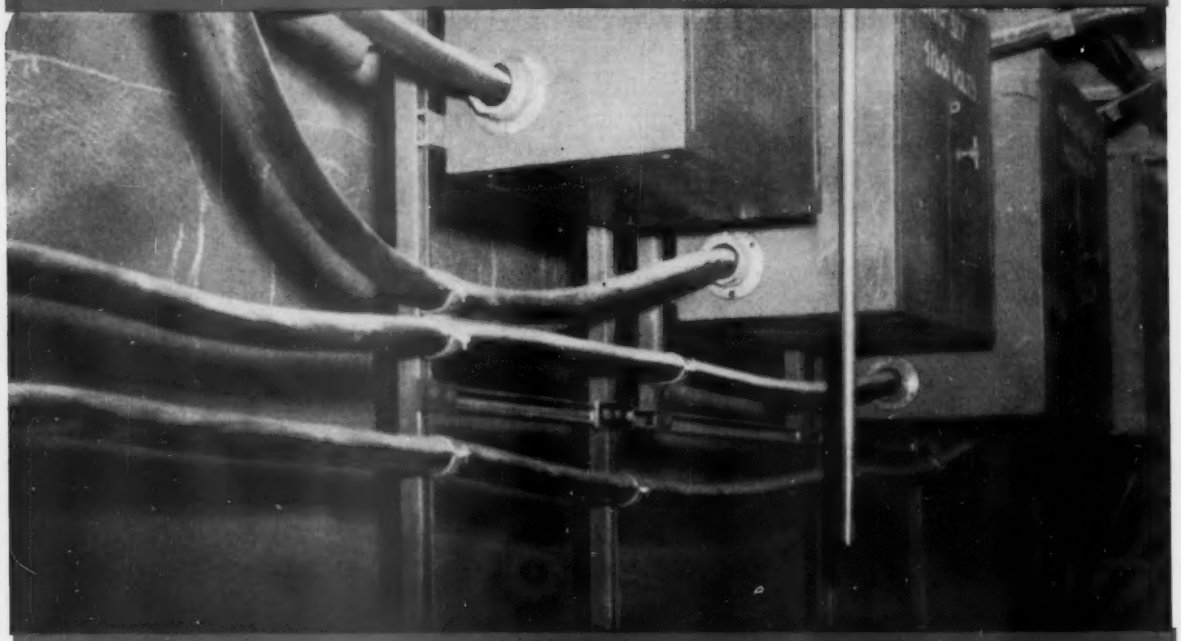
SAFETY VALVES for DIESEL STEAM GENERATORS

Easy accurate adjustment for opening and blow-down pressures. Prevent escape of steam into steam generator compartment.

SIGHT GAGES for DIESEL FUEL TANKS

Flexible mounting to fit all standard diesel fuel tanks. Leak proof and practically indestructible.

SEEN



but not heard (from)

A lot depends upon a trustworthy high voltage distribution system. Should this cable carrying 4160 volts from substation to circuit breakers fail, the cost in terms of lost production and work hours would far exceed the price of a new cable.

However, the chances of this cable failing are almost negligible. Why? Because it's a Simplex high voltage feeder cable. It's insulated with the famous Anhydrex XX insulation.

If your high voltage cable insulation is extremely resistant to heat and aging, is not affected by ozone, and is guaranteed not to absorb more than 15 milligrams of water per square inch when soaked for 7 days at 158° F., you're paying for ordinary insulation. If it offers this guarantee *AFTER* being aged for 7 days at 250° F., you're getting the best insulation — Anhydrex XX.

Insulation with a low water-absorption and oxidation rate stands a better chance of keeping its electrical properties, thereby assuring longer service. That's what you want in high voltage feeder cable. That's what you get with Simplex-Anhydrex XX. Write for bulletin Number 1009-A.

Simplex—ANHYDREX XX

SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge 39, Mass.

NEW CAR-CLEANER····PENNSALT PEN-GLO

- **SUPERIOR CLEANING!**
- **BETTER RINSING!**
- **CORROSION-CONTROLLED FORMULA!**

To meet the demand for an improved acid-type car-cleaner, Pennsalt has developed PEN-GLO. Extensive field testing has shown this new product to be outstanding in these important ways:

Superior Cleaning! PEN-GLO* is exceptional in its ability to remove rust and soil, including many types not touched by other cleaners. It completely removes oxide and dirt films from aluminum and stainless steel.

Better Rinsing! This suds-making cleaner rinses quickly and easily, leaving a bright, clean surface, free of streaks.

Well-Inhibited! Because it contains a more effective inhibitor, PEN-GLO provides outstanding performance without attacking or marring painted surfaces. It also reduces corrosion of bare metal surfaces.

This concentrated, free-flowing granular material is 100% active, mixes readily in water, can be applied manually or by an automatic car-washer. Pennsalt ships it in 400-lb. drums from Wyandotte, Mich.

for paint stripping . . .
Pennsalt Cleaner 23 is still best! Economical, powerful, easily used . . . in soak tanks or applied by hot-flow method. Quick, thorough, free-rinsing. Leaves chemically clean, slightly alkaline surface.

Would you like to see a test? A Pennsalt Railroad Service Man will gladly arrange a side-by-side demonstration of your present cleaner and new PEN-GLO. Just write: Railroad Maintenance Dept., Pennsylvania Salt Manufacturing Company, 501 Widener Building, Philadelphia 7, Pennsylvania.

Pennsalt Chemicals

*PEN-GLO *is a Pennsalt Trade Mark*

CONTROLLED-POWER CLEANING FOR CORROSION CONTROL

Conventions in Print—An Invitation

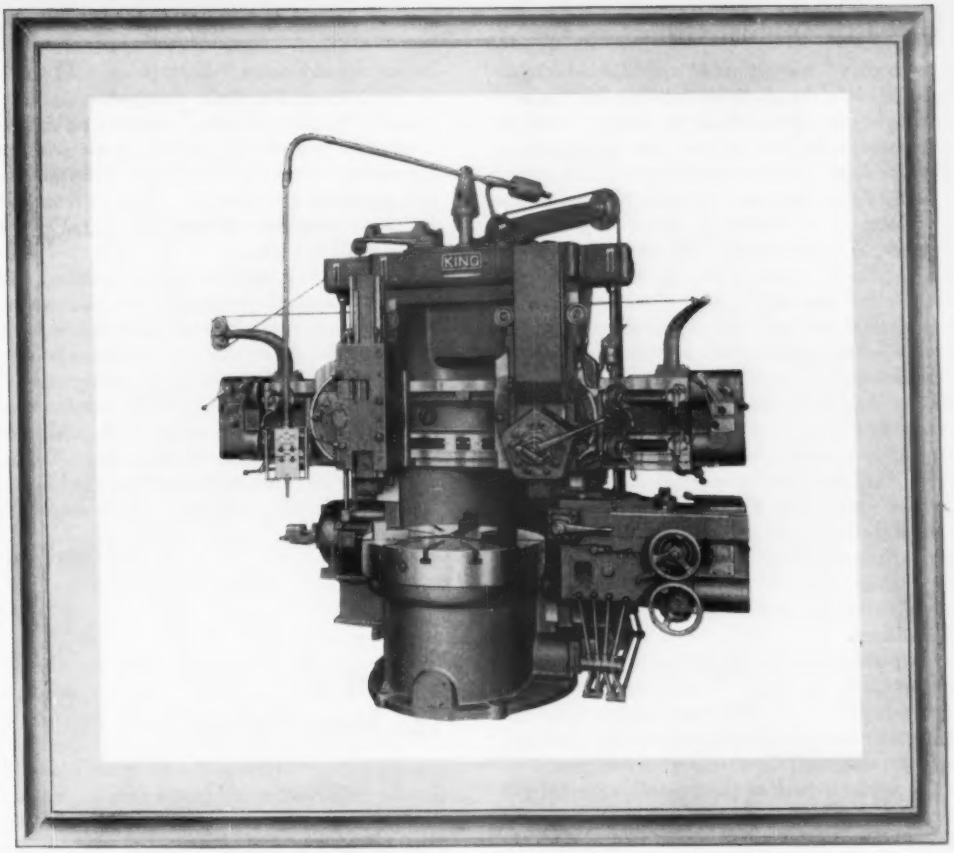
It is with regret that we print the announcement of the cancellation of the September meetings of the Coordinated Mechanical Associations and the related exhibit of the Allied Railway Supply Association on another page in this issue.

The decision not to hold these meetings and exhibit, unfortunately not consistent with the general desire to maintain an optimistic outlook businesswise, halts the year's work of the associations in midstream. Their officers, without the opportunity to participate in reaching a decision to which the essentially independent and voluntary status of these associations and their importance in their fields should entitle them, now face another important decision. Shall the work of the committees in preparation for the September meetings be discontinued, to be taken up in time for completion before the 1955 meetings? Or shall the year's work be completed in 1954 and new assignments be made for 1955?

Whichever course is adopted, the organizations are bound to suffer injury from a loss of momentum, the restoration of which will require extra effort during another year. To continue the year's work to completion, so far as this is possible without meetings, however, will keep this loss to a minimum and maintain unbroken the continuity of between-the-meetings activities of the organizations.

The columns of the October issue of *Railway Locomotives and Cars* have been offered to the associations of the Coordinated group for the dissemination of their reports and papers throughout the locomotive and car departments. The editors will work closely with the officers of those associations who believe that such a medium of publication in addition to their own year books will be beneficial to the railroads and to the associations themselves.

A BASIC "PART OF THE PICTURE"
IN MODERN LOCOMOTIVE MAINTENANCE



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EDITORIALS

A.A.R. Research Intensified

At a time when there is widespread apprehension in industrial America as to the possible "leveling off" in business after many years of war-time production, it is refreshing and encouraging to note the increasing interest of American railroads in engineering research. The annual report of 1953, issued by the Research Center of the Association of American Railroads, gives a fine picture of overall research activities of the various divisions of the A.A.R. during last year. A visit to the new mechanical Research Laboratory at Chicago, however, intensifies one's awareness of the keen desire of railroad executives for a scientific approach to solution of the many problems involved in keeping the greatest transportation system in the world functioning with maximum effectiveness.

The reasons for concentrated research by the A.A.R. are manifold. This activity is supported by the railroads on a pro rata basis according to income. This gives the small railroad an opportunity to participate both in supporting the work and benefitting from the results. The smaller railroads also have a voice in guiding the activities through representation on Mechanical Division committees.

As in the past the foremost rule governing any type of railroad equipment is the factor of safety; that is, protection of passengers, employees and lading. Constant and unending efforts are being made to improve the safety factor of every individual piece of equipment or material which forms a part of the modern transportion machine. Railroads are often unjustly criticized for the length of time required to adopt some new material, method, or radically new type of equipment. The general public should be informed that safety considerations are the primary reason for delay in adopting new designs and methods until exhaustive research and service tests have demonstrated their soundness and reliability.

Next in importance is efficiency. Without subsidies, the railroads have built up a transportion system for the mass movement of men and materials unequalled anywhere in the world, or by any other method of transportation. With the high wage scale enjoyed by railroad personnel and the enormous amount of money invested in physical properties, the only way to maintain the system is by constantly increasing the efficiency and service life of the equipment. Some insight into the effort of the railroads to keep these two factors—safety and efficiency—in the forefront of their activities may be gained by even a brief survey of work now being done at the A.A.R. Research Center.

The new Mechanical Research Laboratory, although not yet completely equipped, is already on a working basis and new equipment is being installed as soon as received. The 27,000-lb. draft gear testing machine, formerly at Purdue University, is being used to test new designs of draft gears which must pass A.A.R. certification requirements before being sold to the railroads. A heavy-duty Dennison Multipress Cycling machine is installed to determine the probable service life of freight truck side frames and snubbing devices. A full-scale journal-testing machine, built by Baldwin-Lima-Hamilton, will probably be received ready for controlled temperature tests between —60 and 130 deg., F., by the time this issue is off the press.

Research has always been something with an air of mystery about it to the layman, but there is nothing mystical about the railroad research now going on. It represents intensive study of everyday problems by practical men with the necessary background of technical education and experience, with imagination and vision backed up by common sense, with pride and loyalty to the job often so typical of railroaders. To an exceptional degree, the research staffs now engaged in technical studies for the A.A.R. conform to these specifications.

Beware of Too Many Gadgets

A wheel shop foreman was recently reported to remark that he could get more production out of his shop if he could release the men who were kept busy maintaining some of the tricky labor-saving gadgets installed and put them to work running machines. Whether this statement is entirely true in its implication that more man-hours are expended in maintaining a lot of these homemade gadgets than are saved by their use is open to question. It may very well have been made on the spur of the moment following several failures which occurred in unusually rapid succession, the recurrence of which would be unlikely.

But the fact does remain that a lot devices used around shops can cost more time than they save, especially those that are used infrequently. The time required to find and prepare them for their job can easily exceed the time they save doing the job. There are even a small percentage of gadgets used regularly, the setup time on which exceeds the time they save on the job.

Does this mean that one should jump to the conclusion that such gadgets have no place in the shop? Not necessarily. Their main purpose may well be to improve the quality or accuracy of the finished job, rather than to reduce the time required to do it. Or, the prime purpose may be to increase safety. The attainment of any of these objectives can easily justify an increase in the time re-

quired to do the job.

Yet the majority of jigs, fixtures and other gadgets are built mainly to save time, and it can generally be said that in total they contribute substantially to the overall efficiency of most shops. What problem does exist would seem to lie primarily in adding refinements, largely minor in nature, that would permit maximum gain to be realized.

One way suggests itself as a means of incorporating these small changes that could give big benefits. That is is more cooperation between the talents available among mechanical personnel. The man who does the job every day usually knows the most about the problems involved in doing it and what he needs to do it with. Yet he has little opportunity to become proficient at putting his ideas into finished design form. The result is often a device, which, while it effects a big improvement over the previous method of doing the job, may be crude and lacking in a few minor refinements that could make it far more valuable.

Would it not therefore be a good idea for shop officers to encourage cooperative effort between the man on the job who knows best what is needed, and the shop engineer or another who has had more experience and a better background in taking the rough edges off an idea and in putting it into final usable form with a minimum of bugs and disadvantages?

Steam to Diesel— To Electric

The flexibility of diesel motive power has produced amazing results. Starting out as a switcher, it progressed to include, first, passenger and then freight service. Perhaps it was foisted upon the railroads, but the situation has been a little like that of the doctor who gives the protesting patient vitamins and cures him in spite of himself.

There are those who insist that if the same energy used to develop the diesel had been put into steam locomotives, we would now be operating the railroads more efficiently with steam power,—but that is loose talk. By the same token, we now might have steam automobiles—but we haven't. And now everyone is looking forward to the time, not very far distant, when the diesel will replace all other forms of motive power in this country—almost.

The almost is the straight electric locomotive and multiple-unit car. Although the diesel has recently replaced electric locomotives in a number of instances, engineers keep coming up with new ideas of how to use electric motive power. And they are good engineers too, and not cranks obsessed with an idea.

Basically, a railroad electrification is justified only when the traffic is heavy enough to pay for the distribution system, and other attendant costs. After this situation has been satisfied by a study, someone must have the courage of his convictions and go out after the money needed to make the large investment required. Contact systems cannot be purchased with equipment trust certificates.

Right now there seems to be no place in the United States where a new railroad electrification can be born. The signs of the zodiac are wrong, but they are changing. Most notable among these changes are the growth of cities, the inadequacy of the automobile to meet commuters' needs, the slowly rising cost of liquid fuel and the relatively declining price of electric power.

When these factors will build up the necessary pressure is anybody's guess, but there is no substitute for m.u. cars for handling mass passenger transportation, and it would seem logical that the first demand for electrification will be to meet the needs of commutation. Conceivably, this can be abetted by the utilities. Their power networks have grown to such size that the problems of load unbalance caused by a single-phase load are no longer as great as they were a few years ago. With the advent of the rectifier car and locomotive, 60-cycle power can be used on the contact system. Might the utilities be prevailed upon, for a consideration, to deliver power to the locomotive instead of to the edge of the railroad property?

And facilities for maintaining the electric locomotive and car have already been provided by the diesel. The diesel electric shop includes practically everything required for the electric locomotive and another barrier to electrification is down. Don't hold your breath till it happens, but don't be surprised when it does.

NEW BOOKS

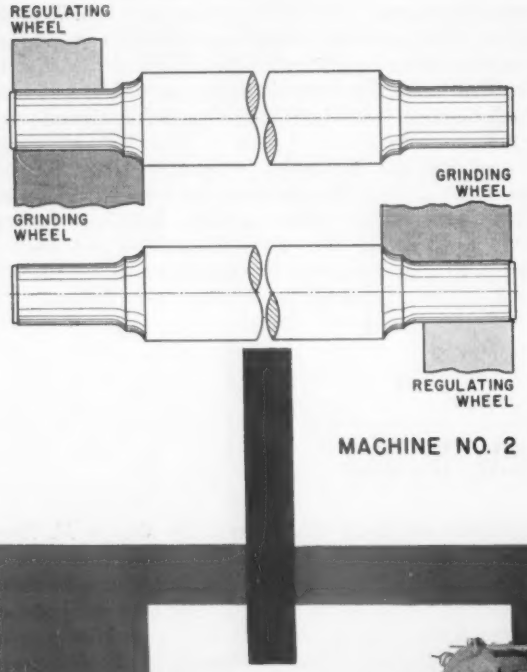
ELEMENTS OF HEAT TREATMENT. *By George M. Enos (now deceased) and William E. Fontaine.* This book is the outgrowth of notes used in the first course in Metal Processing given to freshman engineering students at Purdue University. It covers the basic principles governing the application of heat to alter the mechanical properties of metals. Annealing, hardening, tempering and normalizing are defined, and how each process is used to get the metal characteristics needed for a specific job demonstrated. Casting, forging, rolling, welding, machining and other processes related directly or indirectly to heat treament are briefly discussed. Cartoon-type illustrations add clarity and interest to the descriptions.

John Wiley & Sons, 440 Fourth avenue, New York 16. Price, $5.

ELEMENTS OF MECHANISM. *By Venton Levy Doughtie and Walter H. James.* This book carries forward the work of earlier authors. It brings up to date the application of fundamental principles and simple mathematics in the field of mechanical movement and develops, through the study of the more fundamental machine elements and analyses of their motions combined in certain ways, the habits of thought and the power of visualization necessary in the analysis of any mechanical device, no matter how complicated. The terminology of the various industrial fields is used and the examples are of a type familiar to industry.

John Wiley & Sons, 440 Fourth avenue, New York 16. Price, $6.

Now you can centerless grind car wheel axles



It's a big job to produce 90 half-ton car wheel axles per 8-hour shift. One railway equipment manufacturer does it by employing many of the latest automation techniques. Two CINCINNATI FILMATIC No. 3 Centerless Grinders are included in the automated production line. The first machine grinds the anti-friction bearing diameter, dust collar diameter, and adjacent radii in one operation, at one end of the axle. The axle rolls over an elevated "highway" to the second machine, where the corresponding bearing diameters and adjacent radii are ground. ¶ Two interesting innovations are incorporated in this CINCINNATI Centerless equipment. 1) A variable speed power driven outboard roller support serves as a helper drive to rotate the axle. Lateral movement of a cross slide on this support is synchronized with the infeed movement of the machine's regulating wheel slide. 2) A continuous caliper type gage insures size control during grinding, to an accuracy of less than half the allowable tolerance. ¶ CINCINNATI No. 3 Centerless Grinding Machines, with their exclusive FILMATIC bearing spindle mounting, are head and shoulders above any other precision grinder for handling work of this type. Catalog No. G-570-3 gives you a few reasons why. Write for a copy, or look in Sweet's Machine Tool Catalog for brief specifications.

CINCINNATI GRINDERS INCORPORATED
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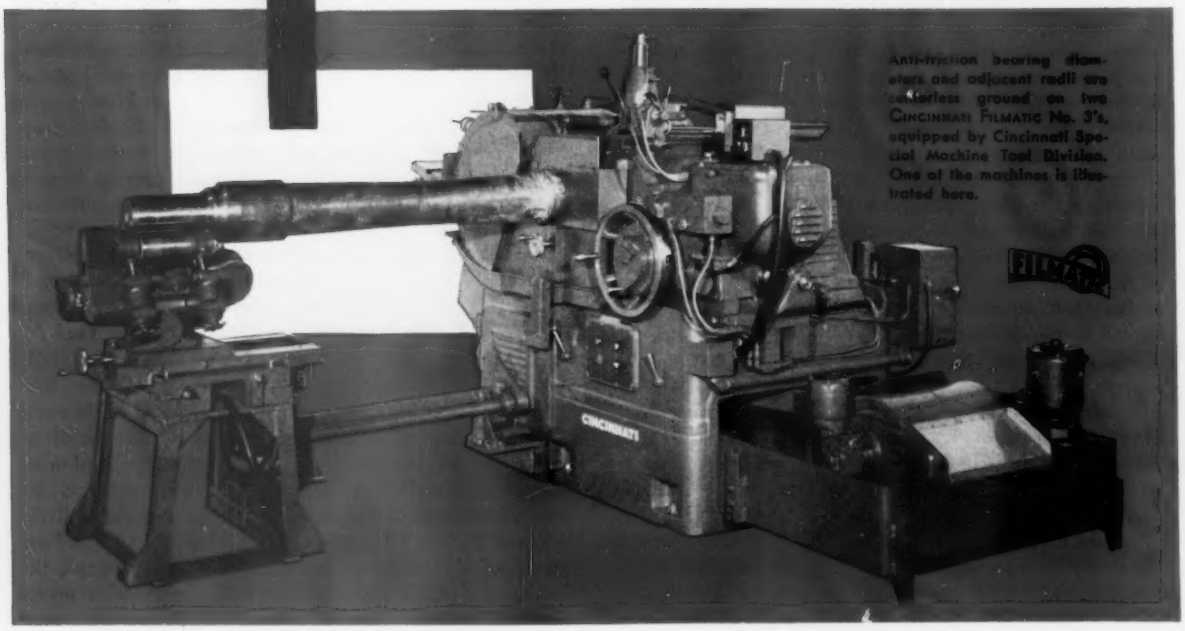

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CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
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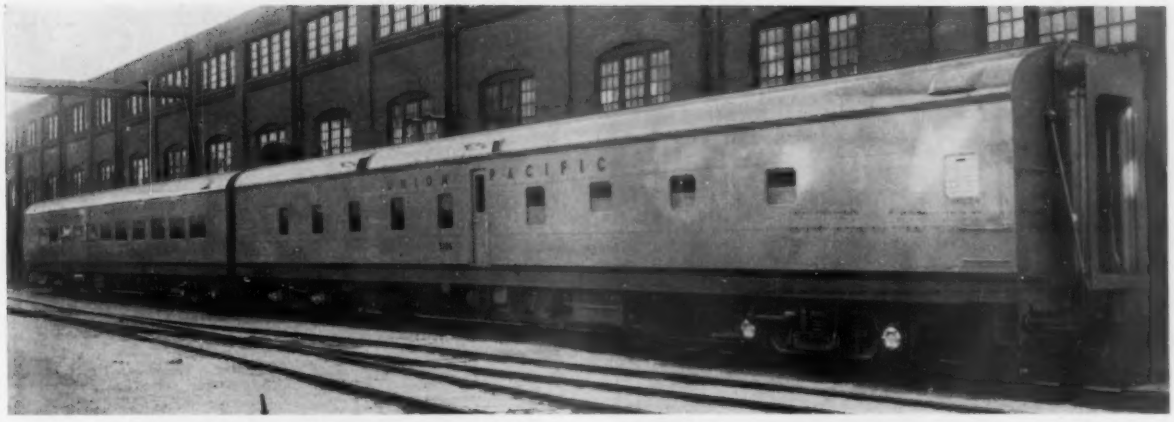


The dining and kitchen-dormitory cars are pin connected in a drawbar pocket in the bolster casting of the latter.

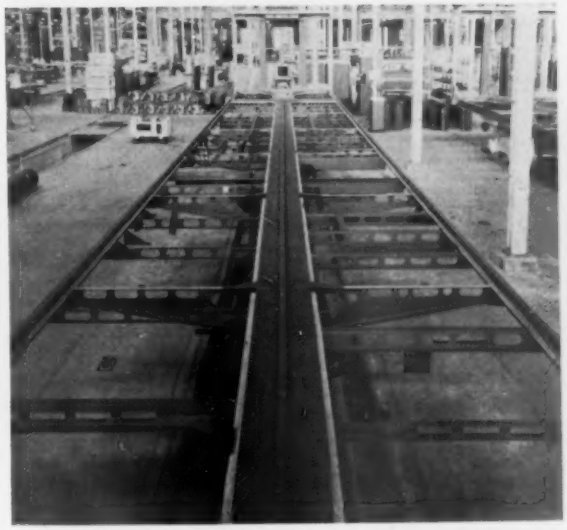
U. P. Buys Aluminum-Alloy Passenger Cars

Eleven different types make up order for new equipment built by American Car & Foundry Co.

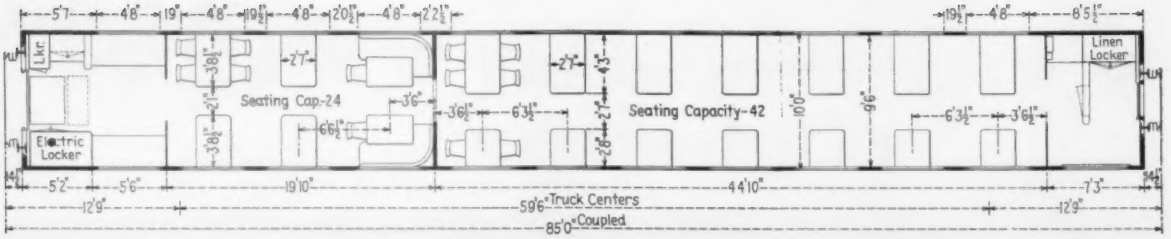
THE American Car & Foundry Co. is delivering to the Union Pacific 112 passenger-train cars of 11 types. Fourteen chair cars, 10 open-section sleepers, 2 dining-room cars and 2 kitchen-dormitory cars (operating as two-car units), and 24 baggage cars have already been delivered. Twenty-four chair cars; 4 open-section sleepers; 9 baggage cars; 2 postal-mail-storage cars; 2 five-bedroom, 2 compartment, 2 drawing-room cars; 4 lunch-counter diners; 5 dome coaches; 5 dome-observation cars; and 5 dome diners will be delivered later. In addition, the Chicago & North Western is participating in the provision of equipment in trains jointly operated with the UP, having purchased from the same builder 6 chair cars and 2 head-end cars.

Some of the new cars are assigned to the two re-equipped "City of Denver" train sets which went into service on January 10. For the two trains the assignment includes two baggage cars (one from each railroad); four coaches from the C&NW order, the two UP twin dining-kitchen cars, and two UP 14-section sleepers.

Each chair car seats 44 passengers in Sleepy-Hollow double coach seats with leg rests. In 30 of the UP cars the



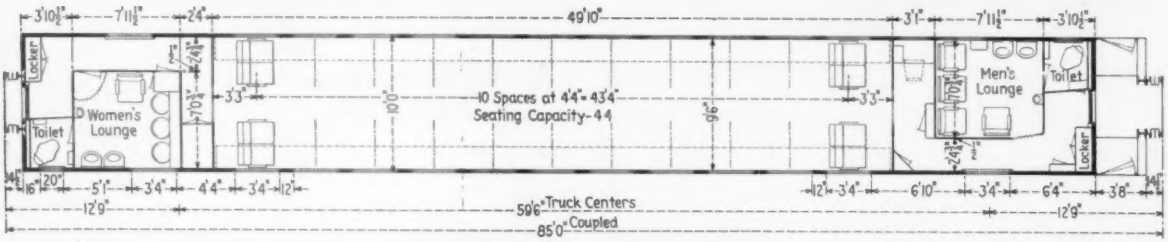
The underframe of a typical chair car during construction at ACF plant.



The dining car seats 66 persons.

The dining cars are decorated in tones of green, gold, and maroon. The ceilings and venetian blinds are green.

Twelve of the UP coaches are decorated in ivory, rose, blue green, and blue; another 12, in green, gray, tan and brown.



The chair cars have commodious lounges.

seats also have adjustable head rests. Men's and women's lounges and toilets are at opposite ends of each car.

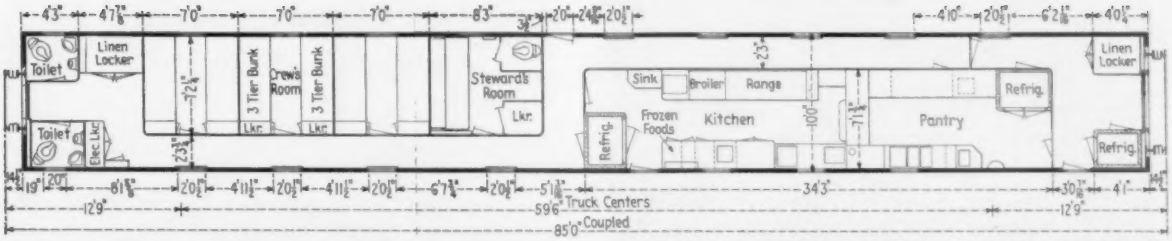
The dining-room cars have tables for 66 persons. The main dining room has seven tables for four persons on one side and seven for two persons on the opposite side. A smaller compartment at the end next to the kitchen car has four tables, each seating four persons in the customary dining chairs, and two tables each of which seats four persons, three at a corner sofa and one in a dining chair. Adjoining this compartment is a waiting lounge with built-in settees for six persons.

The kitchen and pantry in the kitchen-dormitory car occupy a space 34 ft. 3 in. long. About 13 ft. 4 in. of this is pantry.

The principal equipment in the kitchen and pantry are Stearnes Presto-log coal-fired range and broiler and Stearnes steam table. There are two two-gallon coffee urns, two soup jars, a two-comparment steam cooker, and a Savory gas toaster. With the exception of the fish box and kitchen chill box, which are cooled with water ice, all refrigerators in the kitchen and pantry are cooled with dry ice with Carbofrezer two-temperature control.

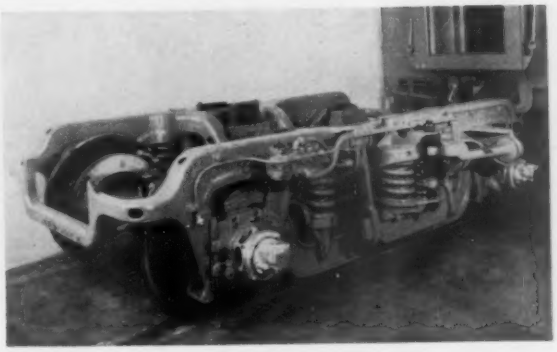
Each dining and kitchen-car pair is coupled with a single drawbar which is pin-connected at each end to a drawbar pocket in the combination bolster and buffer casting. The doorways in the adjoining ends of the two cars are approximately 4 ft. wide and are closed by biparting sliding doors. The doors are opened by National Pneumatic operators actuated by foot pressure on a large treadle in the floor. Regular end doors on all cars are sliding type operated by National Pneumatic door-operators.

Water for the dining car is supplied from a 200-gal. tank underneath the car. There are two 200-gal. supply tanks underneath each kitchen car and a divided 160-gal. tank overhead in the kitchen. The hot-water portion of this tank has a capacity of 15 gallons and is connected to a hot-water coil in the range.



The kitchen-dormitory car can accommodate 20 persons.

C&NW truck, equipped with inside swing hangers.



UP truck, equipped with outside swing hangers.

Fourteen sleepers have 14 open sections and men's and women's lounges at opposite ends of the car. Two sleepers, for later delivery, have five bedrooms, two compartments, and two drawing rooms.

The car bodies are of girder construction with underframes of low-alloy, high-tensile steel assembled by welding, and the superstructure of aluminum alloy, riveted. The center sills are Z-26 sections, welded, of U.S.S. low-alloy, high-tensile steel. Bolsters are cast integral with the buffers and draft sills. The steel Z-section side sills of the under-frame are joined to the aluminum-alloy angle side sills of the body side frames by riveting.

Side posts, intermediate end posts, carlines and purlines are extruded aluminum Z-26 sections, for which several alloys and tempers of aluminum are used, depending upon location in the structure. Roof and side sheathing are $\frac{5}{32}$-in. Alclad. Low-alloy, high-tensile steel side posts are used at all jacking points. Center end posts are 8-in. openhearth car-builder's H-beams reinforced with $\frac{5}{8}$-in. shear plates.

The lower floor is of 16-gage stainless steel over which the Z-section stringers are laid. On these the steel corrugated flooring is laid, separated from the stringers by strips of Presdwood. Both top and bottom corrugations of the floor are filled with cork board, and a top floor of Armstrong cork is laid in cement. The corrugated steel floor is attached to the supports with Huck steel pull-through rivets.

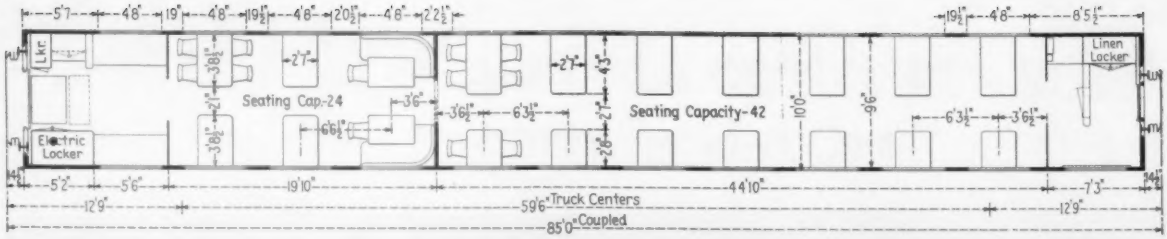
In the kitchen of each kitchen-dormitory car the stainless-steel Keystone-floor is riveted to the floor stringers with Huck rivets. Z-section longitudinal and lateral stiffeners of stainless steel are welded to the top of the Keystone, and the spaces between them is filled with Tucolith. There is a 7-in. center trough in the stainless-steel top floor, from the bottom of which are 2-in. drain openings. Maple floor racks are used in the kitchen and pantry.

The floors of the baggage cars are laid on 2-in. nailing strips which are bolted to the top of the Z-section stringers. On these is laid the diagonal under floor and the Worthwood end-grain strip block top floor, with heavy asphalt paper between. Fish racks are self-draining stainless-steel pans in which may be set removable sections of wood floor. There are two 15-ft. racks near each end of the baggage cars and two in the postal-mail-storage cars.

Three inches of insulation are applied to sides, ends, roofs and floors of all of the cars. This is Ultralite Fiberglas on the UP chair cars, dining cars, and sleeping cars, and Johns-Manville Stonefelt Type A on the C&NW chair cars and the UP baggage and postal-mail-storage cars.

All of the passenger-carrying cars have Commonwealth four-wheel trucks. The UP trucks have a 9-ft. wheel base and outside swing hangers. The C&NW trucks have a wheel base of 8 ft. 6 in. and the swink hangers inside. The wheels are 36-in. multiple-wear rolled steel on the UP cars, and 36½-in. on the C&NW cars, all mounted on 6-in. by 11-in. axles. Hyatt roller bearings are applied on 30 UP chair cars, the diners, kitchen cars, and sleepers. Timken bearings are applied on eight UP chair cars and on the C&NW chair cars. On three of the latter and on all of the UP cars the bearings have $\frac{3}{8}$-in. internal lateral; on the other C&NW cars the bearings are of the standard type. All journal boxes have stench-bomb heat indicators. Pedestals on the UP cars are 14-1/16 in. wide and have rubber-cushioned liners. Those on the C&NW cars are 13$\frac{3}{8}$ in. wide with steel liners. The trucks have Houdaille friction shock absorbers. Fabreeka sound-deadening material is applied on the journal-box equalizer seats, and above the equalizer springs.

Center plates are 24 in. in diameter. The UP cars have Thermoid wear plates and steel and linoleum liners underneath. Gatke wear plates are applied on the C&NW cars. There are no side bearings on the passenger-carrying cars and there is a clearance of ¼ in. between the truck and body bearing brackets.



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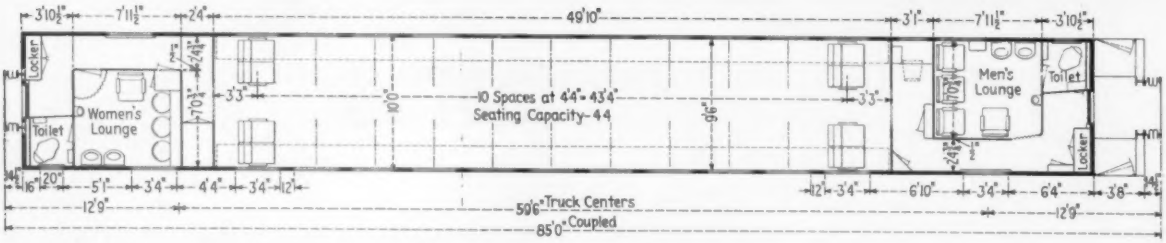


The chair cars have commodious lounges.

seats also have adjustable head rests. Men's and women's lounges and toilets are at opposite ends of each car.

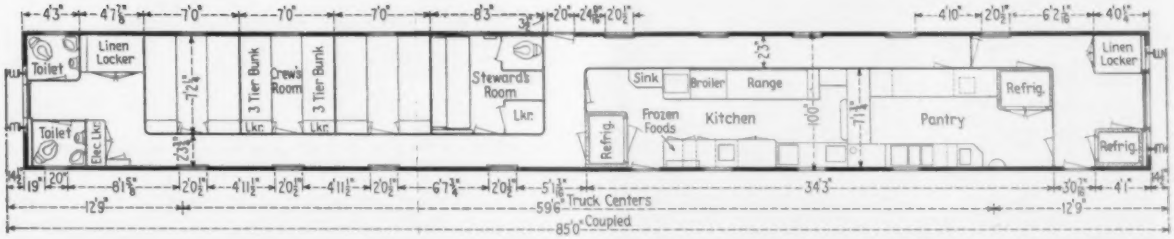
The dining-room cars have tables for 66 persons. The main dining room has seven tables for four persons on one side and seven for two persons on the opposite side. A smaller compartment at the end next to the kitchen car has four tables, each seating four persons in the customary dining chairs, and two tables each of which seats four persons, three at a corner sofa and one in a dining chair. Adjoining this compartment is a waiting lounge with built-in settees for six persons.

The kitchen and pantry in the kitchen-dormitory car occupy a space 34 ft. 3 in. long. About 13 ft. 4 in. of this is pantry.

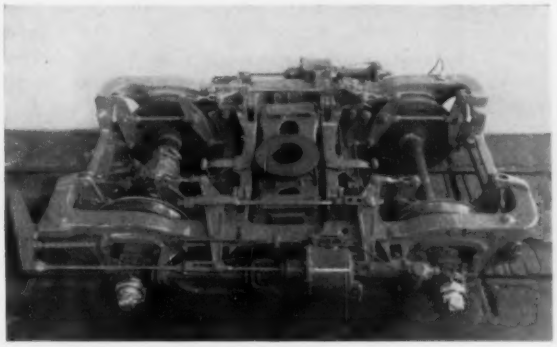
The principal equipment in the kitchen and pantry are Stearnes Presto-log coal-fired range and broiler and Stearnes steam table. There are two two-gallon coffee urns, two soup jars, a two-comparment steam cooker, and a Savory gas toaster. With the exception of the fish box and kitchen chill box, which are cooled with water ice, all refrigerators in the kitchen and pantry are cooled with dry ice with Carbofrezer two-temperature control.

Each dining and kitchen-car pair is coupled with a single drawbar which is pin-connected at each end to a drawbar pocket in the combination bolster and buffer casting. The doorways in the adjoining ends of the two cars are approximately 4 ft. wide and are closed by biparting sliding doors. The doors are opened by National Pneumatic operators actuated by foot pressure on a large treadle in the floor. Regular end doors on all cars are sliding type operated by National Pneumatic door-operators.

Water for the dining car is supplied from a 200-gal. tank underneath the car. There are two 200-gal. supply tanks underneath each kitchen car and a divided 160-gal. tank overhead in the kitchen. The hot-water portion of this tank has a capacity of 15 gallons and is connected to a hot-water coil in the range.



The kitchen-dormitory car can accommodate 20 persons.



C&NW truck, equipped with inside swing hangers.

UP truck, equipped with outside swing hangers.

Fourteen sleepers have 14 open sections and men's and women's lounges at opposite ends of the car. Two sleepers, for later delivery, have five bedrooms, two compartments, and two drawing rooms.

The car bodies are of girder construction with underframes of low-alloy, high-tensile steel assembled by welding, and the superstructure of aluminum alloy, riveted. The center sills are Z-26 sections, welded, of U.S.S. low-alloy, high-tensile steel. Bolsters are cast integral with the buffers and draft sills. The steel Z-section side sills of the under-frame are joined to the aluminum-alloy angle side sills of the body side frames by riveting.

Side posts, intermediate end posts, carlines and purlines are extruded aluminum Z-26 sections, for which several alloys and tempers of aluminum are used, depending upon location in the structure. Roof and side sheathing are $\frac{5}{32}$-in. Alclad. Low-alloy, high-tensile steel side posts are used at all jacking points. Center end posts are 8-in. openhearth car-builder's H-beams reinforced with $\frac{5}{8}$-in. shear plates.

The lower floor is of 16-gage stainless steel over which the Z-section stringers are laid. On these the steel corrugated flooring is laid, separated from the stringers by strips of Presdwood. Both top and bottom corrugations of the floor are filled with cork board, and a top floor of Armstrong cork is laid in cement. The corrugated steel floor is attached to the supports with Huck steel pull-through rivets.

In the kitchen of each kitchen-dormitory car the stainless-steel Keystone-floor is riveted to the floor stringers with Huck rivets. Z-section longitudinal and lateral stiffeners of stainless steel are welded to the top of the Keystone, and the spaces between them is filled with Tucolith. There is a 7-in. center trough in the stainless-steel top floor, from the bottom of which are 2-in. drain openings. Maple floor racks are used in the kitchen and pantry.

The floors of the baggage cars are laid on 2-in. nailing strips which are bolted to the top of the Z-section stringers. On these is laid the diagonal under floor and the Worthwood end-grain strip block top floor, with heavy asphalt paper between. Fish racks are self-draining stainless-steel pans in which may be set removable sections of wood floor. There are two 15-ft. racks near each end of the baggage cars and two in the postal-mail-storage cars.

Three inches of insulation are applied to sides, ends, roofs and floors of all of the cars. This is Ultralite Fiberglas on the UP chair cars, dining cars, and sleeping cars, and Johns-Manville Stonefelt Type A on the C&NW chair cars and the UP baggage and postal-mail-storage cars.

All of the passenger-carrying cars have Commonwealth four-wheel trucks. The UP trucks have a 9-ft. wheel base and outside swing hangers. The C&NW trucks have a wheel base of 8 ft. 6 in. and the swink hangers inside. The wheels are 36-in. multiple-wear rolled steel on the UP cars, and 36½-in. on the C&NW cars, all mounted on 6-in. by 11-in. axles. Hyatt roller bearings are applied on 30 UP chair cars, the diners, kitchen cars, and sleepers. Timken bearings are applied on eight UP chair cars and on the C&NW chair cars. On three of the latter and on all of the UP cars the bearings have $\frac{3}{8}$-in. internal lateral; on the other C&NW cars the bearings are of the standard type. All journal boxes have stench-bomb heat indicators. Pedestals on the UP cars are 14-1/16 in. wide and have rubber-cushioned liners. Those on the C&NW cars are 13⅜ in. wide with steel liners. The trucks have Houdaille friction shock absorbers. Fabreeka sound-deadening material is applied on the journal-box equalizer seats, and above the equalizer springs.

Center plates are 24 in. in diameter. The UP cars have Thermoid wear plates and steel and linoleum liners underneath. Gatke wear plates are applied on the C&NW cars. There are no side bearings on the passenger-carrying cars and there is a clearance of ¼ in. between the truck and body bearing brackets.

Interior details of a UP chair car.

The baggage and postal-mail-storage cars of both orders have six-wheel trucks, the axles of which are the same size as those on the passenger-carrying cars. The C&NW cars have Timken roller bearings. Four of the UP cars have Hyatt roller bearings and four, Timken bearings. The remaining 25 have SKF bearings.

All of the UP cars are equipped with HSC air brakes with electro-pneumatic straight-air control and AP Decelostats, Budd disc brakes are on all of the UP cars but only on the two outside axles of the six-wheel trucks. The diners, kitchen cars, sleepers, 25 of the UP baggage cars, and the UP postal-mail-storage cars have the New York Air Brake equipment. All of the chair cars and eight baggage cars have Westinghouse equipment. The C&NW chair cars and baggage cars have Westinghouse air brake equipment and have Simplex unit clasp brakes. Peacock hand brakes, which develop braking power not less than 40 per cent of the loaded car weight, are on all of the cars.

All cars have Waughmat twin-cushion draft gears and tightlock couplers. Fabreeka sound-deadening material is applied on the coupler-carrier pads.

The UP chair cars have the Safety electromechanical air conditioning system of 8 tons' capacity. Sectional evaporators provide for modulated cooling. On the UP dining cars and sleepers and on the C&NW chair cars the equipment is Frigidaire of the same capacity, with evaporators divided into two equal parts for modulation. All condensers are of the full-flooded type. Cool air enters the passenger compartment of the chair cars and the dining room of the dining cars through Multi-Vent ceiling panels. In the men's and women's lounges and passageways Anemostats are employed. There are four Anemostats in the passageway of the kitchen-dormitory car. Air enters the dormitory rooms through multi-louvered registers.

The passenger-carrying cars are heated by a combination of thermostatically controlled fin-tube floor radiation and overhead heat from a heating coil in the air-conditioning evaporators. In the six C&NW chair cars, in 18 of the UP chair cars, and in the two 5-2-2 sleepers, the floor heat controls are Minneapolis-Honeywell. In the remaining 20 UP chair cars and the section sleeping cars, dining cars and kitchen cars the controls are Vapor.

WEIGHTS OF THE PASSENGER-TRAIN CARS

UP baggage cars	130,440
UP diners (half of twin unit)	130,540
UP kitchen-dormitory (half of twin unit)	143,000
UP chair cars	134,680
C&NW chair cars	139,000
UP open-section sleepers	151,800

The baggage cars of both roads have the Vapor manually controlled system of steam heat in copper fin-tube radiation, with the addition of two Vapor unit type blower heaters, each with a separate manually controlled steam valve and separate blower switch. The postal-mail-storage cars have the manually controlled fin-tube radiation in the baggage compartment with Vapor thermostatically controlled copper fin-tube radiation in the railway post-office compartment.

The chair cars and sleepers have a water supply of 400 gallons contained in two interconnected under-body tanks. The built-in drinking-water coolers have a compartment for cooling bottled milk. Those in the UP chair cars and sleepers are Chase; those in the C&NW chair cars are Sunroc.

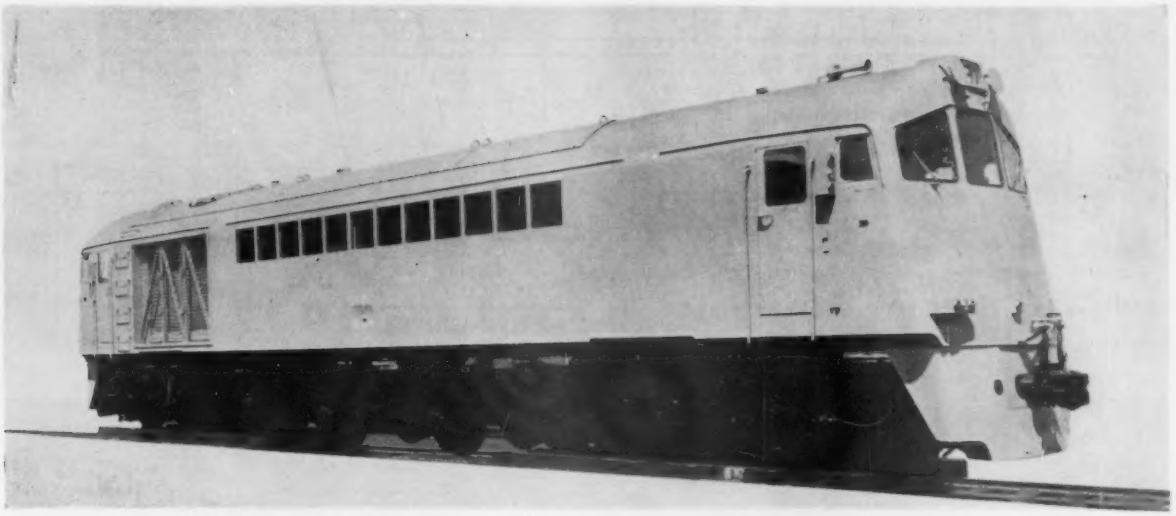
Electrical Equipment

The chair cars, sleeping cars, and the dining and kitchen cars have 25-kw. body-hung Genemotors with 40-volt generators and 32-hp., 220-volt 3-phase a.c. motors. The baggage cars for both roads have 4-kw. d.c. generators; the UP postal-mail-storage cars have 10-kw generators. Spicer drives are used on all of the cars. Batteries of three manufacturers and of five different capacities are installed on the cars of the two orders. The UP passenger-carrying cars, except the sleepers, have batteries of 1,032-amp. hr. capacity. The batteries on the C&NW chair cars are 1,100-amp. hr. capacity; those on the UP sleepers, 1,176-amp. hr. capacity. The C&NW baggage cars have batteries of 450-amp. hr. capacity, and the UP baggage cars, of 510-amp. hr. capacity. The two orders include Gould-National, Exide, and Edison batteries. The cars are equipped with three electrical train lines. One is a 64-volt air-brake control line with 6-pole receptacles; another, a telephone train line with 14-pole receptacles, and the third, a two-conductor, 4/0 emergency lighting train line.

The dining room of the diner is lighted with fluorescent lamps in the cove fixtures. Sixty-cycle alternating current is supplied at 110 volts by two Safety motor-alternators with a combined capacity of 2,000 watts. A single 1,000-watt motor-alternator unit is in the kitchen.

All lighting in the chair cars and sleepers is incandescent. For razor and curling-iron outlets 110-volt 60-cycle a.c. power is supplied by a Cornell-Dubilier vibrator converter which has a capacity of 100 watts.

All passenger-carrying cars, except the C&NW chair cars, are equipped with radio, wire-recording and public-address systems. The radio equipment is RCA. There are six speakers in the ceilings of the passenger compartment of each chair car, six in the ceiling of the dining room of each dining car, and four in each sleeping car. In each car there is a selector and volume control, a paging selector box, and a microphone and paging switch. Automatic telephones for intratrain communication are placed in a cabinet above the steward's desk in each dining car and in each sleeping car.



One of the 2700 hp., meter-gage diesel-electric locomatives for the Indonesian State Railways

Diesel-Electrics for Indonesia

Center truck for weight carrying only permits locomotive to meet requirements of light axle loading and limited clearance

By

J. K. Erzer and A. C. Siciliano*

THE Indonesian Republic embraces some 3,000 islands, formerly known as the Netherlands East Indies, lying between the Malay Peninsula and Australia. These have a total area of nearly 750,000 square miles and an estimated population of 78,000,000. The principal islands are Sumatra, Java, Borneo, Celebes and New Guinea.

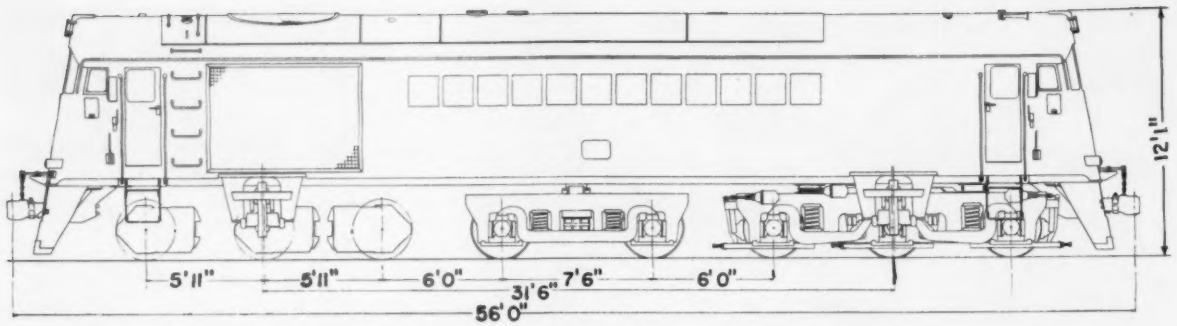
Railroading in this part of the world dates back to 1894 when operation was begun with steam locomotives on 42-in. gage track. Since then the system has grown to more than 3,000 miles of line, located almost entirely on the islands of Sumatra and Java. Some experiments have been conducted with electrification, but currently it is felt that dieselization will provide the best form of motive power.

Since 1948 the Indonesian Republic has been carrying out a general expansion program including the rehabilitation and modernization of its railway system. As part of this, the State Railways has purchased 27 diesel-electric locomotives for road service from the International General Electric Company. These have been built at the Erie Works of the General Electric Company and are now going into service.

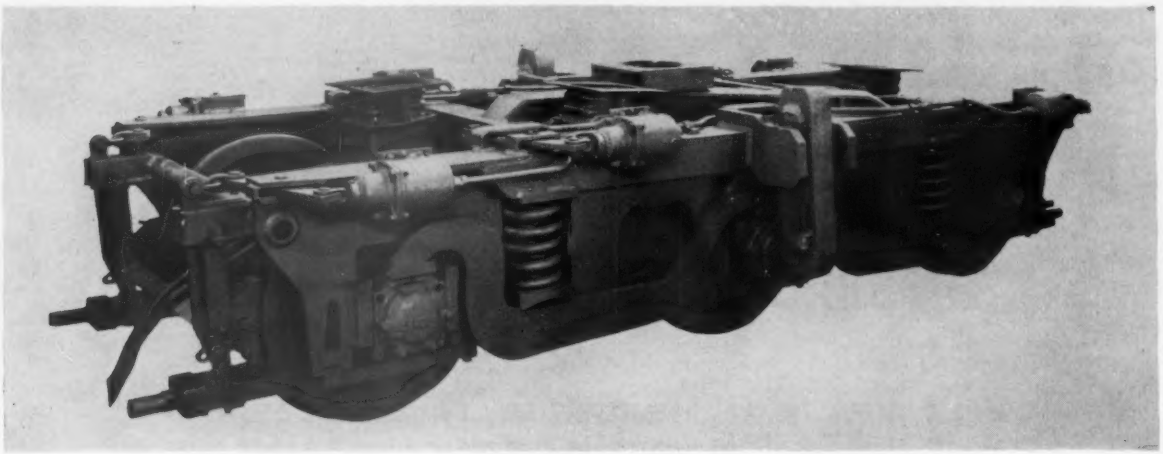
The island of Java, where these locomotives will be put into service, is slightly larger than New York State yet has over three times that state's population. Jakarta the capital (formerly Batavia) has a population of 2,800,000—greater than that of Philadelphia. The new locomotives will operate on a 500-mile run from Jakarta to Soerabaja, a city nearly as large as Cleveland. The line follows the north coast of Java, crossing many small streams that run down from the mountainous interior. As a result the railway has a total of ten tunnels and crosses nearly 9,000 bridges. The light construction of many of the bridges, coupled with the low overhead clearance found in some of the tunnels, created special problems in the design and construction of these locomotives.

The entire mechanical design of the locomotive is greatly influenced by the light axle loading and very restricted clearance diagram imposed. Because of these factors it has been necessary to depart from the standard diesel-electric locomotive design in the arrangement of the running gear. The result is a C-2-C wheel arrangement with the center truck being used for weight carrying only. This fills up the space under the locomotive ordinarily occupied by the fuel tank, battery box and air reservoirs, necessitating that these items be placed in the apparatus cab. Principal data concerning the locomotive are given in the table.

* Locomotive and Car Equipment Department, General Electric Co., Erie, Pa.



Side elevation of the locomotive showing the unusual truck arrangement.



Three-axle motor truck with swing motion mechanism located outside the truck frame.

Superstructure

To keep weight to a minimum, fabricated parts are used wherever possible and advantage has been taken of the cab side members and sheets to add stiffness and carry load. The platform is built up of rolled plates and shapes. It has three bolsters and the necessary crossties and needle beams to transfer the major portion of load, buff and tractive effort to the cab side construction. The draft gear housings are fabricated as an integral part of the platform and are arranged to take Henricot automatic couplers. The platform members are so arranged that they form the air ducts of the traction motor cooling system.

The cab is fabricated of sheets and, for the most part, light bent-up sections. The sides are so designed that they act as trusses to carry part of the load and impart added stiffness to the platform. An operator's cab, over five feet in length is located at each end. These have tapered sides so that the locomotive can negotiate the limiting curve without interference. Hatch openings in the roof permit removal of all or any part of the locomotive equipment.

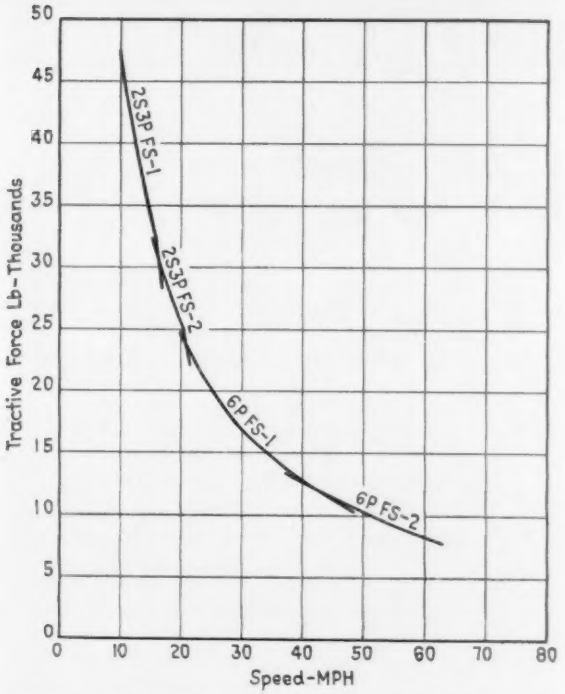
Combustion and cooling air is taken into the engine room through filters located in openings high along the sides of the cab. The radiator compartment, located nead the No. 2 end of the locomotive, has an independent air system. Engine cooling air is drawn in through the radiators which are mounted along the cab sides and exhausted through the roof by a propeller type fan. A center passageway through this compartment provides access to the engine room from the No. 2 end operator's cab.

LOCOMOTIVE DATA-Major Dimensions

Track gage, in.	42
Overall length inside knuckles, ft.-in.	56–0
Height over roof, ft.-in.	11–11 ⅛
Overall height, ft.-in.	12–1 ⅛
Width over cab sheets, ft.-in.	8–8
Overall width, ft.-in.	9–3
Truck wheel base, ft.-in.	11–10
Overall wheel base, ft.-in.	43–2
Minimum radius of curvature, ft.	460
Weight (fully loaded):	
Total locomotive, lb.	207,400
Per driving axle, lb.	25,900
Engine, Alco V-12, hp.	1600
Transmission:	
Driving motors and axles	6
Diameter of wheels, in.	35 ⅝
Tractive force and speed:	
Starting tractive effort force (at 30 per cent adhesion), lb.	46,600
Continuous tractive force, lb.	29,600
Maximum speed, mph.	62
Supplies:	
Fuel, gal.	500
Lubricating oil, gal.	200
Engine cooling water, gal.	250
Sand, cu. ft.	12
Reservoir capacity: Air, cu. in.	19,600
Vacuum, cu. in.	9,800

Running Gear

All three trucks are of the swing-motion swivel type. The two 3-axle driving trucks have the mechanism for achieving swing motion outside the truck frame. This gives adequate space inside for three traction motors, and yet results in a short and compact truck.



Speed-tractive force curve based on 1,600 hp. input to the generator at 1,000 r.p.m., geared 92/19, wheel diameter 35⅝ in.

The truck frames are fabricated by electric arc welding from rolled carbon steel plates and shapes. The center-plates are built integral with the truck frames. Rolled steel wheels, 35⅝ in. in diameter, are used. The end trucks have four sets of carbon steel coil springs, all of which have snubbers. The middle truck uses a conventional swing bolster instead of the outside swing link. It has two sets of three full elliptic springs in addition to four sets of coil springs. The springs on all trucks rest on drop type equalizers. All axles are fitted with grease-lubricated roller bearing journals.

Propulsion Equipment

Power is supplied by an Alco, 12-cylinder, V type, 4-cycle, turbo-supercharged diesel engine capable of developing 1600 hp for traction at 1000 rpm.

The engine is directly connected to a General Electric Model GT-581 separately excited d-c generator which supplies current to six GE-761 traction motors. On the end of this main generator are mounted three gear-driven auxiliary generators. One of these is the amplidyne exciter for the traction generator field. The other two are identical machines to supply power for the traction motor blowers, for battery charging, and for the control system of the locomotive. The whole engine-generator assembly is supported on four pads which are welded to the locomotive platform.

Engine cooling water is circulated through two vertically mounted radiators by a centrifugal pump driven by the diesel engine. Cooling air is drawn through the radiators by a fan mechanically driven from the free end of the engine through a shaft, eddy current clutch and right-angle gear box. Cooling is controlled by varying the fan speed. This is accomplished by a thermostatically-operated temperature controller that controls the excitation of the eddy current clutch.

Lubricating oil is carried in the engine sump and is circulated by a positive displacement pump mounted on the engine. An oil cooler and two oil filters are used.

Combustion air is filtered by four filters mounted in the turbocharger inlet housing. These are easily removable for cleaning.

Control

There is an operator's cab at each end of the locomotive. The engineer's position is on the right hand side as in this country. Grouped at each engineer's position are the throttle lever, selector handle, brake valves, instrument panel, sander control, electric signals, bell ringer, windshield wiper control and light switches.

The control equipment is essentially identical with that used on Alco-GE road locomotives. The throttle lever on the master controller selects the engine speed. Motor transitions are made manually by the selector handle. Control provides series-parallel motor connections and two steps of field shunting.

The power plant is controlled by the General Electric electro-hydraulic governor in conjunction with the amplidyne type of excitation system.

Braking System

Service brakes, Westinghouse Schedule 14EL-V, are combined vacuum for the train and straight air for the locomotive. The locomotive brakes are operated by compressed air either independent of, or in conjunction with, the train brakes. A Gardner-Denver expressor (combined exhauster-compressor), driven from the diesel-engine crankshaft, furnishes vacuum and compressed air for operation of the braking system. The machine has three cylinders, two of which are used as exhausters and the third as a compressor.

The locomotive is equipped with six 7 by 6 brake cylinders per truck to operate clasp type brakes on each wheel of the three-axle trucks. Brake shoe pressure is 60 percent of the wheel load at 50 psi brake cylinder pressure. The middle two-axle truck has no brake equipment.

A hand brake which operates on one wheel is provided for holding the locomotive at standstill.

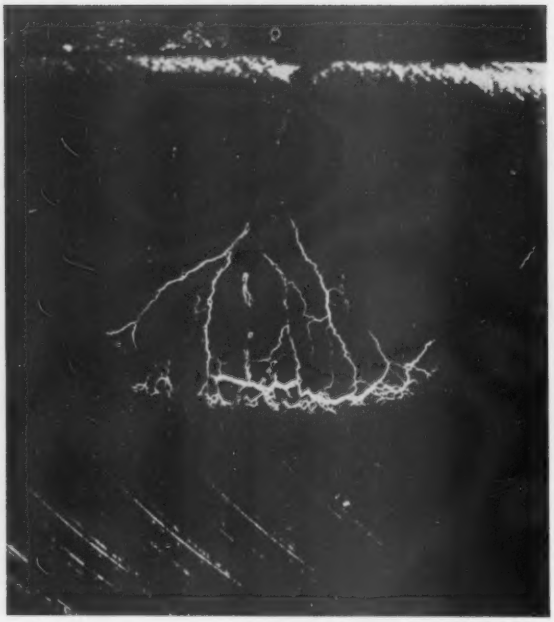
Personnel Training

Because diesel-electric locomotives are new to Indonesia, practically none of the railroad's personnel have any experience with this type of locomotive. Therefore the conversion from steam motive power will present a major training problem. Anticipating this, Indonesian Railway officials sent eight of their supervisory personnel to the United States to get first hand information and experience. They went through an extensive educational program, including training in General Electric Service Shops and on domestic railroad properties. Here they were able to observe current American practice in the maintenance and operation of diesel-electric locomotives.

As they return to Indonesia, these representatives will be largely responsible for the operation, servicing and maintenance of the locomotives, and will also have charge of training the Railroad's personnel.

Copper Penetration of Car Journals*

Ninety per cent of journals broken while overheated are due to this defect, evident on Magnaglo inspection



Four-times magnification of a secondary crack as it appears under the ultra-violet light of the Magnaglo machine showing 1 1/16 in. deep copper-alloy penetration from surface of journals.

Conclusions from Laboratory Tests

- **Journal failures can be produced by a combination of heat developed by abnormal friction, reversal of stress and the presence of non-ferrous alloys in the liquid phase.**
- **Such failures may be verified, with some magnification, by Magnaglo examination. The presence of non-ferrous alloys between the grain boundaries may be detected by metallographic examination of unetched specimens.**
- **On journals that have run hot until rough, cut, or discolored, hairline cracks on the surface shown by Magnaglo inspection are usually indicative of some penetration of bearing metal having occurred. Under Magnaflux examination only, such cracks are either not apparent, or much less definite.**
- **Any journal which has been overheated, although not broken, should be examined carefully for irregular hairline cracks on the surface. If cracks are found, the safest course is to remove such axles from service.**
- **At least 90 per cent of journals that fail by breaking off while overheated are the result of non-ferrous metal penetration of the steel, and each failure occurs because of a single heating at the time of failure.**

THE theory of copper penetration of car journal bearings is not new but has been discussed at various times during the past 25 years. The author has not attempted any bibliographical research or correlation of previously published data on this subject but is offering results of experimental work performed in the test laboratory of the Atchison, Topeka & Santa Fe. The object of these tests was to verify the theory that copper penetration between grain boundaries produces failure in journal bearings. The conclusions reached and the opinions offered are the writer's own and are not to be construed as official pronouncement or acceptance in entirety by the railroad.

The term "Copper Penetration" while more or less generally accepted is really a misnomer. Of all the constituents of journal bearings, copper has the highest melting point, and consequently requires a higher temperature to change the liquid phase than the other constituents.

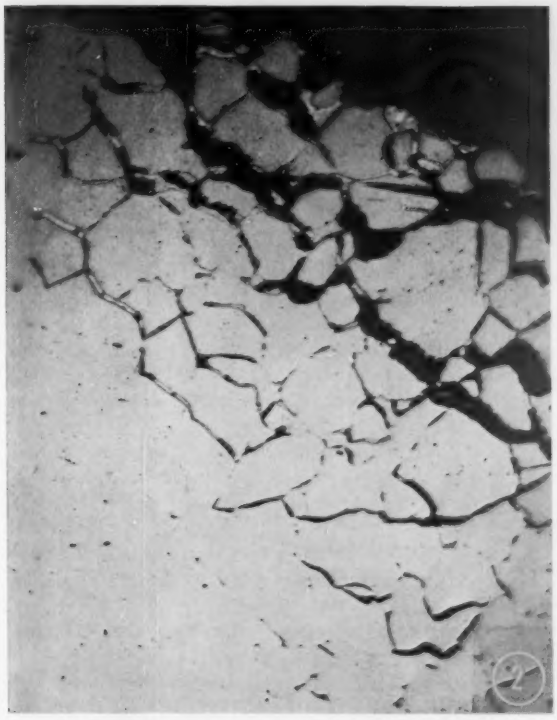
The mechanics of copper penetration failures require that certain conditions must be met if failure is to ensue. Briefly, these conditions are as follows: (1) A source of heat sufficient to raise the temperature of the journal to or above the melting point of the bearing lining or its constituents but not to the forging temperature of the steel; (2) a stress reversal in the journal; (3) the presence of at least one of the non-ferrous constituents of bearing metal in its liquid phase.

All of these conditions must persist for a time duration of some length, this duration being contingent on the degree of intensity of the individual items mentioned.

On any failure of a car journal the source of heat is friction between the journal and the bearing. Under normal conditions, this generation of heat varies according to speed and to load on the bearing and more particularly, on the bearing unit load, but generally with conditions normal, the running temperature will not exceed 240 to 250 deg F at the contact area between the journal bearing and the babbitt lining. This is well below the melting temperature of bearing linings, and also is of no significance in regard to effect on yield strength of axle steel.

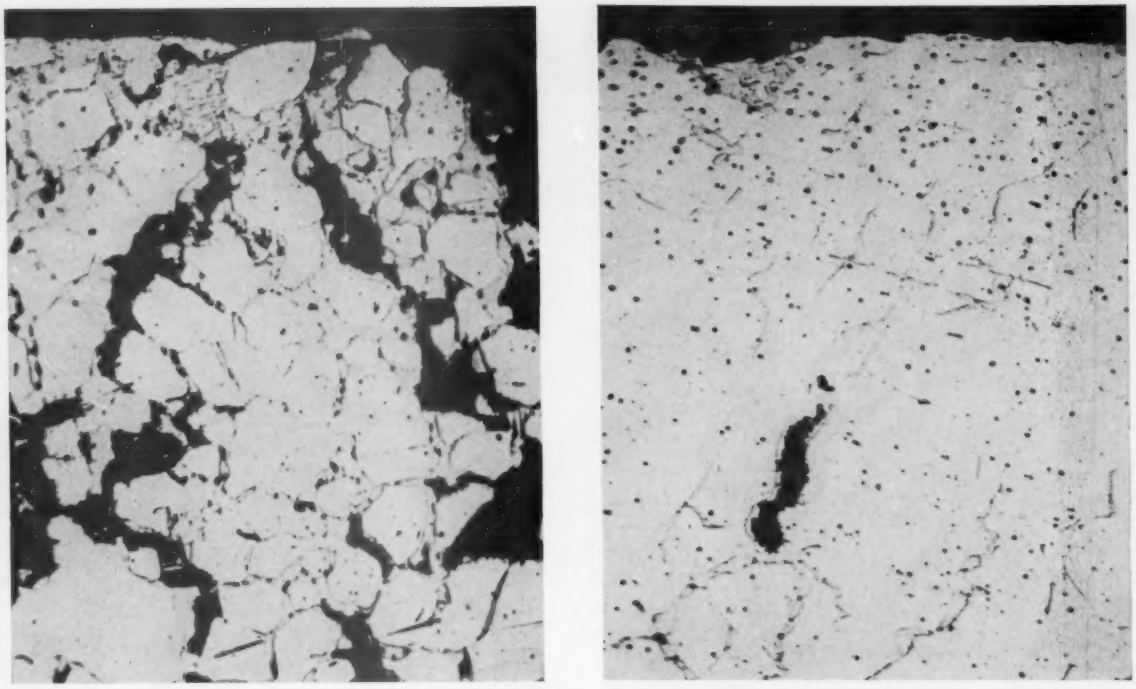
The abnormal conditions of operation, however, are

* Paper presented at Symposium on Non-Destructive Testing, conducted under the auspices of the Magnaflux Corporation at Chicago, November 19 and 20.



Photomicrographs unetched and taken at 100X of journal fracture, showing copper alloy penetrated between the grain boundaries—*1* taken at the surface and continued in *2*; *3* taken at surface 180 deg. from *1*, which is continued in *4*.

the ones that are of concern. A waste grab, a collection of lint or dirt at the edge of bearing on the rising side of the journal, misalignment of a truck side causing excessive thrust on a collar or fillet, uneven distribution of load creating concentrated load condition, or any other malfunction of parts that interrupts the adequate lubrication of the journal, if of sufficient duration, will generate enough heat to satisfy the first condition.



Photomicrographs at 100X, unetched, of failed journal showing (left) copper alloy penetration at edge of fractured face and (right at the journal surface 3/32-in. from the fracture.

The reversal of stress in the journal is always present in a moving car. Maximum stress on a journal is near the fillet at wheel seat. The magnitude of this stress is dependent on the load of the car and contents, and the frequency of the reversal is contingent on the speed, since there is one complete stress reversal cycle in each revolution of the car wheels.

The third condition is usually met without difficulty if the first condition is attained, i.e., the liquid phase of the bearing lining metal or of one or more of its constituents is reached in suficient quantity and of long enough duration to wet the heated stressed surface continually.

The early experiments to verify the development and progression to failure of copper penetration breaks, were as follows. Cylindrical sections cut from axle steel were rotated in a lathe, and pressure applied to a portion of the rotating piece by a block mounted in the tool post of the lathe. In these early experiments the block used to apply pressure was cut from journal bearing bronze although in two of the experiments, a steel block was used.

In these early experiments no attempt was made to verify the pressure and temperature reached. However, the friction between the rotating piece of axle steel and the bronze or steel block was sufficient to heat the rotating specimen to the blue range, and it was also of sufficient temperature to melt the various non-ferrous elements or compounds applied to wet the surface of the heated specimens. These were as follows: Satco metal, lead, tin, antimony and three A.A.R. Babbitt metals.

In the course of these tests, all of the specimens broke while rotating in the lathe. The first specimen in which Satco was the bearing metal used as wetting agent, water was applied as a quench after melting some of the Satco metal on the rotating piece. This specimen broke almost immediately, the fracture resembling a 2-stage break, but

MELTING POINTS OF VARIOUS ELEMENTS IN BEARING METAL ALLOYS

Element	Melting point, deg. F.
Copper	1,981
Arsenic	1,497
Antimony	1,167
Zinc	787
Lead	618
Tin	450
Bronze journal-bearing back	1,700
Journal-bearing babbitt lining	464-493
Satco metal	600-650

examination under magnification showed lead crystals at the grain boundaries to the depth of the initial crack.

Specimen No. 2 with babbitt metal was melted by contact with hot specimen heated by friction between the rotating specimen and the bronze block. The melted babbitt penetrated about ¼ to ⅓ of the diameter before the final failure.

Specimen No. 3 was similar to No. 2 except that lead was used and showed a heavy penetration to about 1/5 of the diameter with scattered penetration to the center of the final failure.

Specimen No. 4 with tin was melted by the frictional heat between rotating specimen and the bronze block. In this failure in addition to the primary fracture a secondary fracture was produced, which is typical of failed journals received at the laboratory.

Specimen No. 5 with antimony for a non-ferrous metal and tested the same as Specimen No. 4, also showed more than one crack produced.

It was noted in the course of these experiments that the melted white metals were absorbed by the rotating heated axle steel specimens similar to absorption of ink by a blotter. As noted above, no record of temperatures or pressures was made other than that the steel specimen was usually of a blue to a dull red color. The time from

the start of application of the friction heat to failure varied from 20 minutes using antimony to 45 minutes using Satco metal. This is not particularly significant here because at ordinary train operating speeds, failure of lubrication may result in journal temperatures higher and in a shorter time interval than was possible in the test setup.

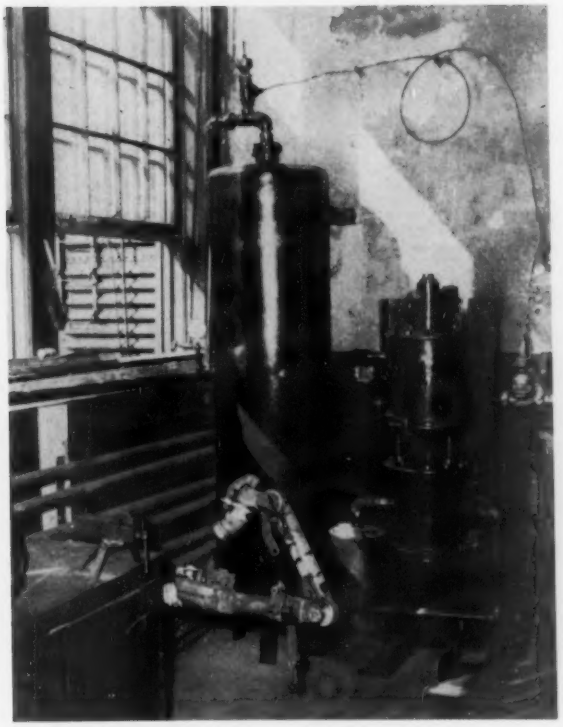
In later experiments by use of a spring loaded jig, measured loads were applied and the heat generated by a friction block only using bronze as the friction block and using babbitt metal as the melted white metal. The time element varied inversely as the pressure applied, that is, with 500 lb pressure on a ½-in. by ½-in. section, failure occurred in 13 min; with 400 lb pressure, failure occurred in 50 min.; with 300 lb pressure failure occurred in 73 min., and with pressure varying between 200 and 250 lb, failure occurred in 114 min.

Other experiments were made where the heating was accelerated by use of a torch to heat the rotating specimen of axle steel to a dull red, simultaneously with application of frictional loading. In these experiments the load applied and the time required to produce failure were considerably less. Thus, after heating with a torch, the application of a frictional load of 50 to 75 lb on a ½ by ½ section caused failure in 19 min., a 100 lb frictional load caused failure in 10 min., and application of 200 lb load caused failure in 2 to 4 minutes.

In all cases, the failures produced were typical of the full-size failed journal stubs that have been received at the laboratory from time to time; that is, the fractured face has a circumferential ring from ¾-in. to 1½-in. deep, with a shiny crystalline appearance and the center portion twisted and torn.

Examination of some 50 or more of these broken journals has been made by Magnaflux and by Magnaglo inspection and by Mettalograph. As a general rule, Magnaflux inspection does not give positive evidence of alloy penetration. On the other hand, Magnaglo inspection of such journals has usually given some evidence by a network of fine hairline cracks on the surface, both at the fractured face and away from the fractured face. Longitudinal slices taken out of the journal stubs, and containing some of these hair cracks at the surface have been examined by metallograph, unetched, and traces of a non-ferrous alloy have been indicated as a network surrounding the grain boundaries of the steel. Metallograph examination of the specimens at 100 magnifications provides only a limited field for examination as to continuity of the alloy penetration. However, examination of the longtitudinal slice under Magnaglo with approximately four magnifications shows the penetration fanning out from primary lines of penetration to form a delta at a depth beneath the surface equivalent to the usual depth of the primary fracture of a journal bearing.

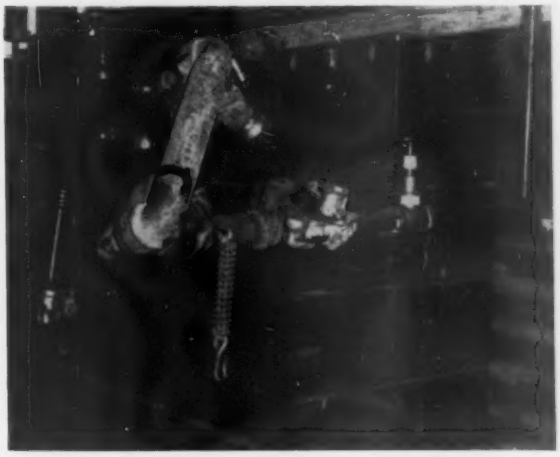
Testing Car Steam Heat Connections



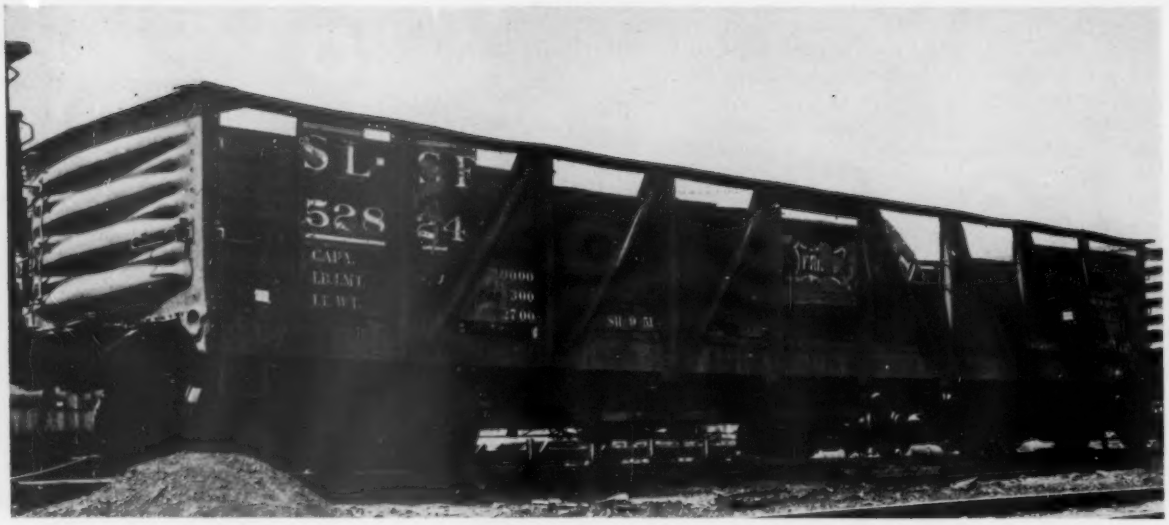
The compact arrangement for testing passenger car steam heat connections before application.

The Wabash car shop in Decatur, Ill., uses an 11-in. steam locomotive air pump to test Vapor steam heat connectors between cars before application. The pump is operated by feeding regular shop air pressure at approximately 90 lb. to the large diameter cylinder, and connecting the test line to the discharge of the small cylinder, giving a pressure of approximately 140 lb. for making the test.

The coupling to be used in service is capped at the discharge end and attached to a dummy coupling on the end of the 140-lb. test line. The check for leakage is made with soap suds.



The connector is capped, attached to a dummy coupling on the 140-lb. line, and tested for leaks with soap suds.



1. Old wooden-side gondolas arrive at Frisco's Yale Yards in Memphis.

Frisco Gondola Car Rebuilding

Modifications include substitution of two H-beams per side for two side stakes and six diagonal braces

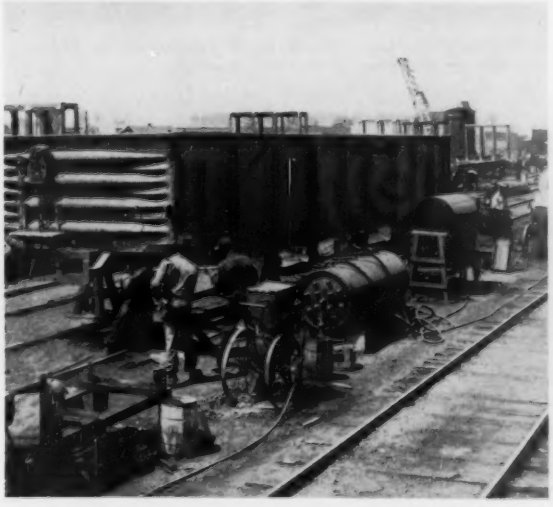
THE Frisco is currently rebuilding 600 composite gondola cars at its Yale Yard at Memphis in a program which includes two modifications to the superstructure. The cars, of 50-ton capacity and originally built 1925 through 1928, are worked on a production line set-up on two tracks, proceeding down one track and up the second.

2. First operation is to knock out bolts, rivets and other obstructions to removing old sides and flooring.

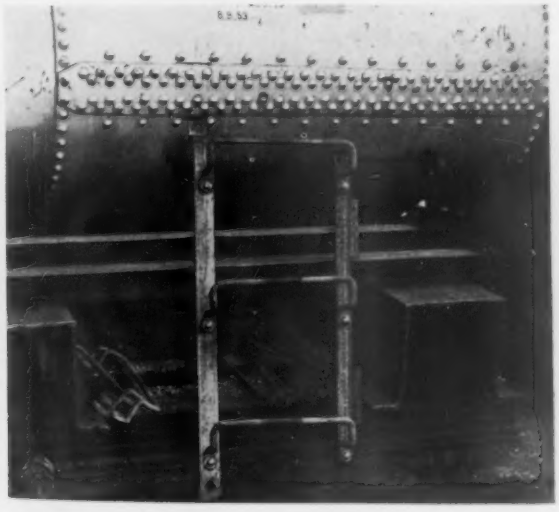
3. Six diagonal side braces and two channel section side stakes on each side were replaced by two H-beams.

4. The three new side sections are riveted together and to the top rail on three jigs like the above.

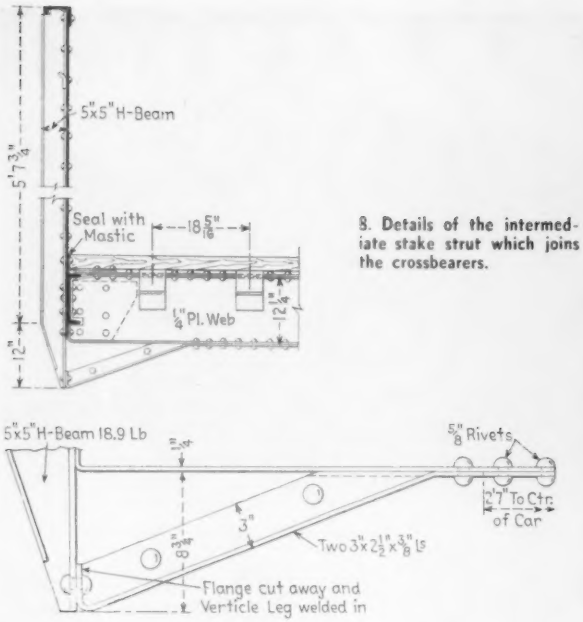
5. When completed, the prefabricated sides are hung and bolted in place temporarily, after which the gondola is hoisted by the locomotive crane for removal and repair of the trucks and wheels.



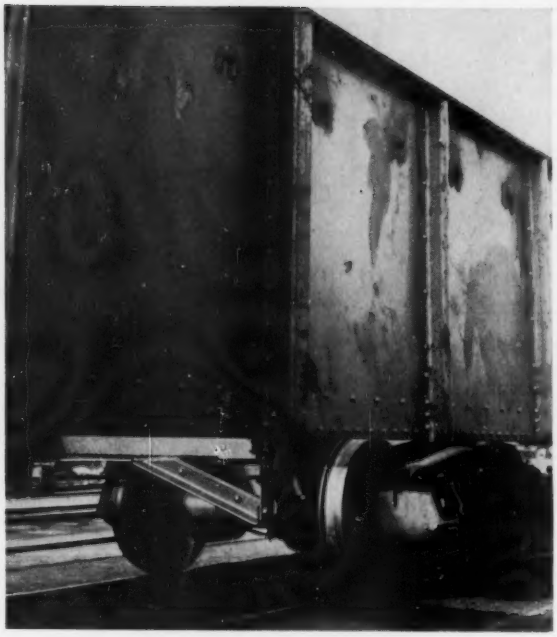
6. While the trucks are being repaired, the body is placed on stands and the sides riveted.



7. At the same time the side jig crew assembles the ladders on this jig for application to the car as a unit.



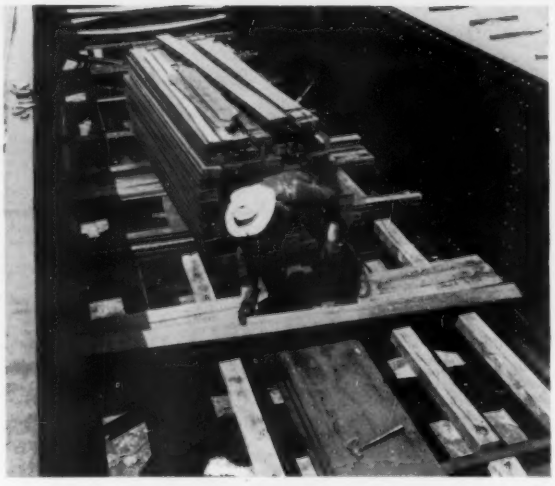
8. Details of the intermediate stake strut which joins the crossbearers.



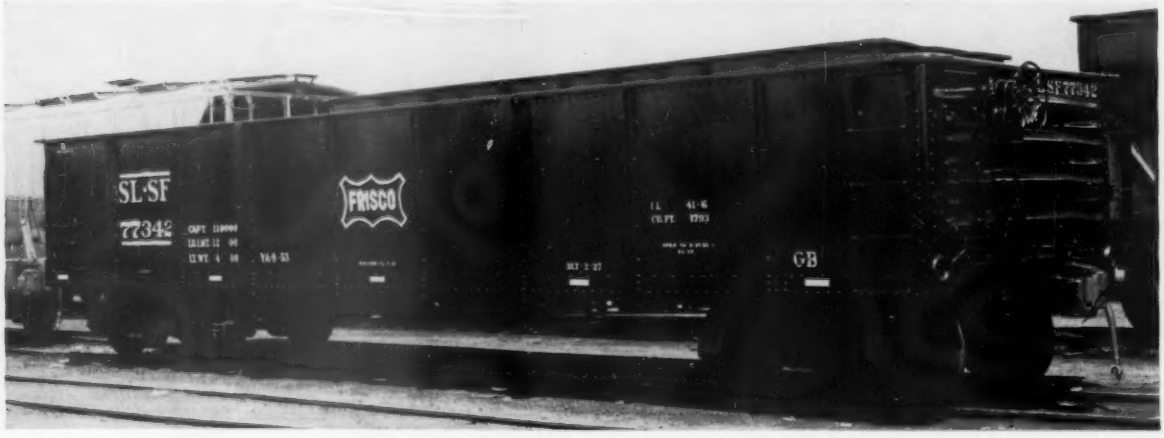
The two modifications to the car are the substitution of two H-beams tied into the cross bearers on each substituting for six diagnonal braces and the installation of ¼-in. carbon steel sides in place of wooden ones. The side sheet sections on each end of the car are 13 ft 10¼ in. long; the center side sheet section is 13 ft 6¼ in. long.

The H-beam (standard 5 in. by 5 in., 18.9 lb.) is used in place of the conventional channel section side stake at the two joints on each side where the center side sheet section joins the side sheet sections on the two ends of the car. The H-beam is formed on the bottom as shown in the drawing and in one of the illustrations to join to the crossbearer through an intermittent stake strut on either side. The intermittent stake strut is built up of two angles 3 in. by 2½ in. by ⅜ in. with the flange cut away on the outer end and a vertical leg welded in place to join it to the inside flange of the H-beam.

The reconditioning work is being carried on at the rate of three cars a day with a work force averaging about 58 men. The work is done at two stripping positions, eight assembly positions (each position having three cars)



9. One of the final steps is the application of the 2¾-in. creosoted tongue-and-groove pine flooring.



OPERATIONS AND MEN REQUIRED FOR REBUILDING FRISCO GONDOLA CARS

Position	Operation	Number of Men: Carmen	Riveters	Welders	Airmen	Painters	Helpers	Remarks
1	Knock out bolts, rivets and any other obstructions to the removal of the wood sides and decking	3	..	..	..	..	3	..
2	Remove wood sides and decking and floor stringers; burn all rivets out and remove bad steel	..	..	..	..	..	..	Same crew as Position 1
3	Fitting-up work on the underframe after cutting down	3	..	..	..	..	3	..
4	Apply and ream metal sides and ends, hand brakes, foot boards and brake steps. The sides were completely sub-assembled on a jig near this position	3	..	..	..	..	3	..
5	Truck work and box packing	1	3	..	..	..	1	3 riveters and six helpers do all riveting.
6	All necessary welding. Air work, including piping and air brake testing. All cover plates not previously renewed are reinforced by welding	..	..	3	2	..	6	..
7	Underframe is coated; car cement applied to inside of car	..	..	..	..	1	..	..
8	Put in floor stringers, apply, nail and bolt floors	3	..	..	..	..	..	..
9	The car is primed and two finish coats are sprayed on	..	..	..	..	*	..	*Same man as Position 7
10	The car is stencilled and light-reflecting tape applied	..	..	..	..	1	..	..
Side jig	Pre-assemble the side and assemble the ladders for application as unit	3	..	..	..	..	3	..

and one jig position. The accompanying tabulation shows the operations and the force required.

At the side jig position the three carmen and three helpers pre-assemble the side and assemble the ladders for application to the car as a unit. While in the side jig, the three sections of the side are riveted together; the side stakes are applied and riveted in place; and the top rail is applied and riveted to the side sheets and side stakes. The top rail and the side sheet sections are put in place by a crane truck; other parts are loaded on the jig by hand.

The side sheet sections are positioned in the jig on heavy wooden blocks at the bottom and lean against braces on the inside surface. They are lined up and secured in position by drawing them tight against the dummy side sill running along the bottom of the wooden jig flooring.

In addition to the men at each of the individual positions previously, there are two hoist operators and two ground men, one truck operator to hang the sheets and top rails on the side jig, ten laborers to do general work and three material supply men.

How C&NW Keeps Tops of Fuel Tanks Clean

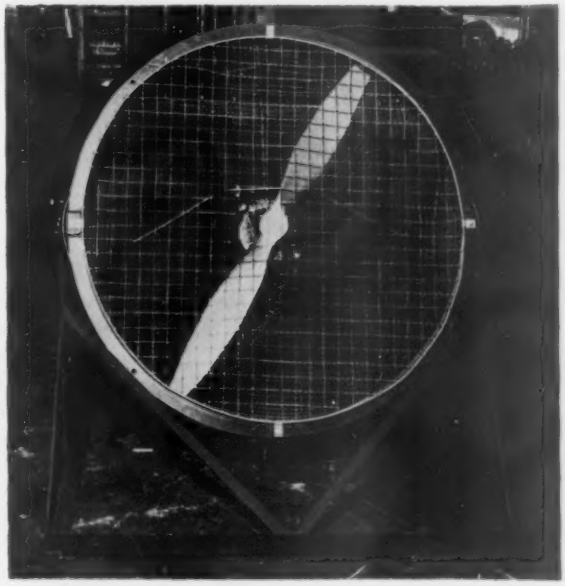
The C&NW is trying out at its Proviso, Ill enginehouse a novel method for keeping tops of fuel tanks clear of oil and grease. When a locomotive arrives from a run with any sign of oily residue on top of the tanks, a few scoops of sand (enough to make a layer somewhat under ¼ in.) are thrown on this surface. This is left on for one trip, during which it is spread evenly by the motion of the locomotive.

When the unit returns to Proviso, the sand is flushed off the top with *cold* water, completely removing all the oil, which has been picked up by the sand. And, during the trip the sand makes oil non-combustible. There is no appreciable spillage of the sand.

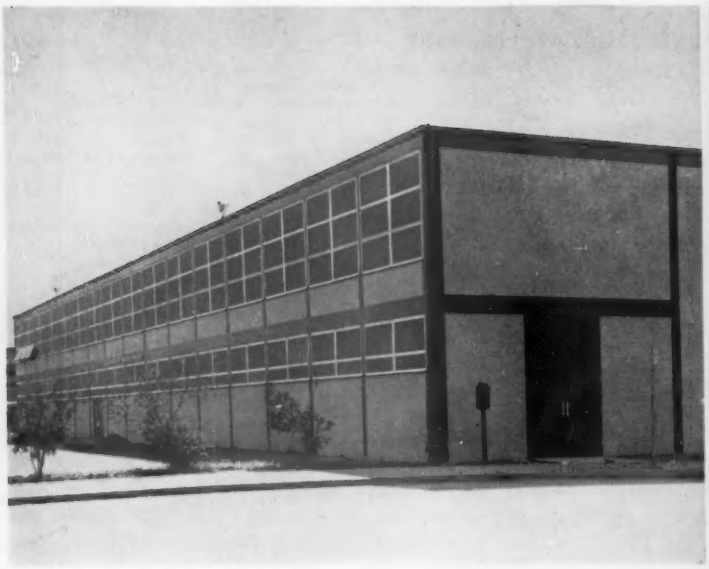
Preventing Paint Fume Accumulation

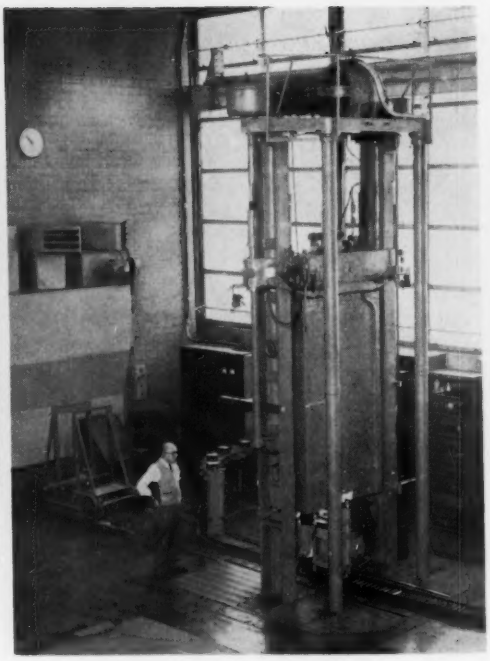
A western road has recently put in service a fan driven by a ½-hp. motor to prevent the accumulation of paint fumes in the bottom of a pit. While the fan does not exhaust the paint fumes to the outside, it does mix them sufficiently with the shop air to keep the mixture below the flash point concentration and thus prevent fire.

The fan stand when in use just rests on the bottom of the pit floor. It can tilt to any angle and is protected on all sides by wire mesh. Casters are to be applied to simplify moving it about.



Fan used to prevent heavy accumulation of paint fumes in bottom of pits by mixing them with air.





Draft-gear test machine with 27,000-lb. tup.

A. A. R. Mechanical Division

Research Lab Now Functioning

THE 1954 research program planned by the Association of American Railroads Mechanical Division will involve expenditures in excess of $400,000 and will be used to carry on work which is actually supplementing extensive tests and development by individual railroads and manufacturers. Many of the troublesome mechanical problems such as hot boxes and diesel locomotive wheel failures are the subject of exhaustive research at this new laboratory. The building for the laboratory was completed in October, 1953, and, while it is still only partially equipped with the facilities which it is ultimately expected to contain, it has reached the stage where the research group can go ahead with its work.

The Armour Research Foundation and the Franklin Institute are collaborating with the Mechanical Division in the study of hot boxes and the Electro-Motive Division of General Motors Corporation and the Technical Board of the Wrough Steel Wheel Industry are working with the Mechanical Division research group on the study of diesel locomotive wheels.

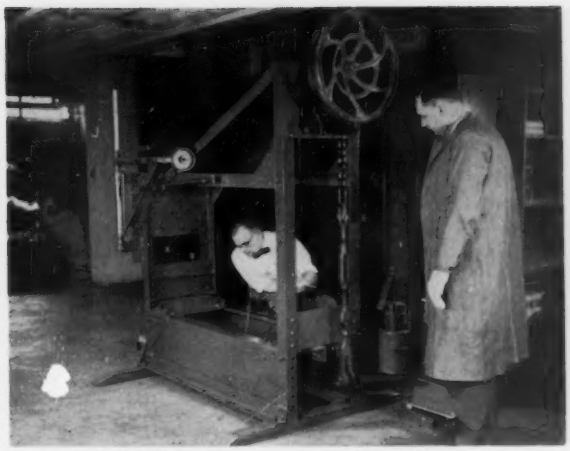
From a laboratory standpoint the outstanding event of 1953 was completion of the new mechanical research building, a modern structure, 72 ft wide by 192 ft long, immediately north of the administration building at the Research Center in Chicago. It follows the same type of architecture. A siding runs from the existing test track into the building so that freight cars may be switched inside and unload by the traveling crane.

The draft gear testing apparatus, formerly housed at Purdue University, is now installed in the new laboratory and mounted on a concrete caisson extending to bed rock, 80 ft below the surface. A hot-cold room is being constructed which will house the new journal-bearing testing machine, especially designed for railroad test work under full journal loads. This room will be completely insulated on walls, ceiling and floor, and will have mechanical equipment to give temperature control within all extremes encountered in America.

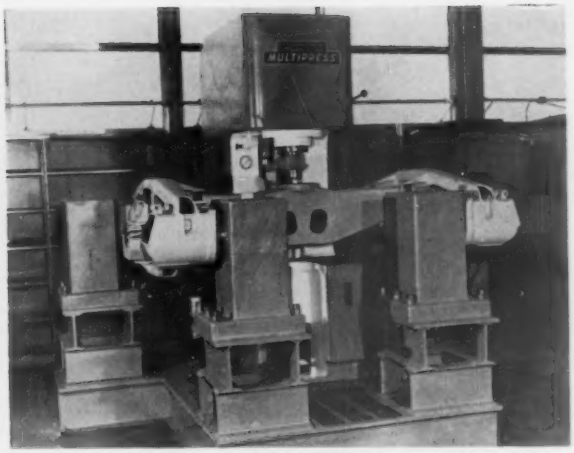
The test machine is designed for both solid and roller-type journal-bearing assemblies and will handle many phases of testing in connection with journal-bearing lubricating materials. The pilot testing machine and the eight-spindle half-size journal-testing machine are now in the new building and will supplement the full-size test machine.

A complete chemical laboratory for the testing and analysis of petroleum products has been installed on the balcony of the new building as a complement to mechanical testing apparatus. A heavy-duty hydraulic press has been installed which, with special fittings, will first be used to evaluate the service life expectancy of snubbing devices for frieght car trucks. These laboratory tests will supplement information obtained from the road testing of trucks suitable for high-speed freight service. Other testing equipment will be installed as received.

The building has office facilities for the test personnel, a computation room, and allocated space for the necessary machine tools. Small and portable test equipment will be placed on the balcony, adjacent to the petroleum



A manual test machine used in A.A.R. certification of freight-car hand brakes.



Hydraulic cycle-loading machine for testing snubbers and springs in complete freight truck assemblies.

chemical laboratory, the main floor being reserved for heavy testing apparatus, office space, storage facilities for parts and appliances and the machine shop.

The new mechanical laboratory, although not yet completely equipped, is now on a working basis and new testing devices are being installed as rapidly as possible. The draft-gear machine with 27,000-lb tup, or drop hammer, is being used to test new draft-gear designs which must pass A.A.R. certification requirements before use in interchange service and which must be subject to subsequent periodic check tests of performance. A 9,000-lb tup is also available for use when necessary in the draft-gear test machine.

During any intervals when the drop-test machine is not required for A.A.R. draft-gear certification work, it will be available for any other heavy testing or development conducted either for individual railroads or manfacturers. In the former case, charges will be on the basis of actual cost and in the latter the same as when the drop hammer was located at Purdue, namely, $150 a day for the first three days and $100 a day thereafter.

The chemical laboratory, used solely for testing and analyzing car journal oils and greases, is fully equipped for that purpose. Roller bearing greases are now subject to certification by the A.A.R. and each product submitted for use in axle roller bearings must pass a rigid road service test and chemical analysis.

Following extensive A.A.R. road service tests of freight car truck and snubbing devices in high-speed service several years ago, it was decided to subject those designs with the highest rating to laboratory tests in order to determine the life expectancy of such devices. The Dennison heavy-duty Multipress Cycling machine is being used for this purpose. Truck designs are tested in this machine, which has a load capacity of 50 tons, a 15-in. stroke, and can produce vibrations up to 120 per minute for as long as necessary to determine wear rates and probable service life of the snubber units.

By far the major A.A.R. research project under way at this time is the general subject of journal-bearing lubrication. Many separate studies include the design of new type solid bearings, improvements in the existing standard bearing-wedge assembly, investigations of

Eight-spindle lubrication test machine used in determining efficiencies of waste and oil combinations.

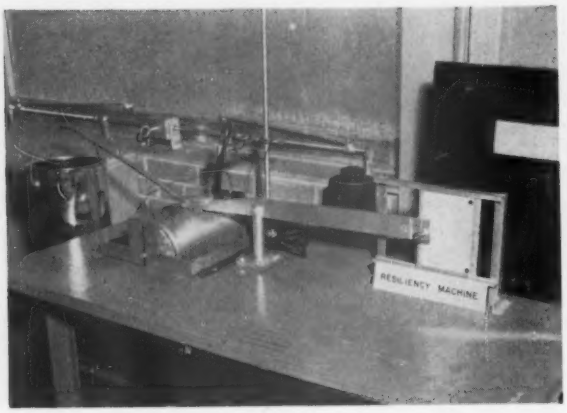
various metals and alloys, and analysis of the actual bearing assembly.

Other intensive studies are being made of the oils, additives, and waste that make up lubricating parts of the standard waste-pack. Numerous substitutes are being tested both in the laboratory and in road service in an effort to improve axle journal lubrication.

Mechanical lubricators are also being tested and, when such devices show possible merit, a limited number are placed in road service under controlled conditions, as specified by the A.A.R. Lubrication Committee. Many such materials and devices are given preliminary laboratory tests in the pilot testing machine and the eight-spindle, half-size journal-testing machine.

It is expected that the full-scale journal-testing machine now being built by the Baldwin-Lima-Hamilton Corporation and its subsidiary, the Sonntag Scientific Corporation, will be delivered in March and placed in the hot-cold room with necessary equipment to control temperatures from —60 deg F to 130 deg F. Solid type bearings will be tested at controlled temperatures anywhere within this range and information developed highly essential to the reduction of hot boxes.

Of prime consideration in the journal-box lubrication studies is the test of car journal oils in which all major oil companies are cooperating through their own re-



This machine assists in studies of packing resiliency—an important factor in journal lubrication.

search laboratories. The objective is to find a journal oil which will function satisfactorily within the extremes of summer and winter temperatures encountered.

Conclusion Drawn from Studies

Typical of the practical conclusions drawn from A.A.R. lubrication studies to date are those given in the eight progress report just released, as follows: Of seven sample oils tested, none gave indications of better lubrication in road service; lighter oils show greater loss due to vaporization; pressure of waste against journals causes a significant proportion of the heat generated; bearing temperatures decrease with lower oil viscosity, but film strength in that case needs further investigation; a new type of waste-retaining rib in the bottom of the journal box, designed at the A.A.R. Research Center, resist packing roll or displacement; MS-40 extreme-pressure, sulphur-type oil additives show some discoloration but no corrosive effect on the highly finished journals; cellulose block substitute journal-box packing shows some superior characteristics but also a loss of resiliency at subzero temperatures; a glass-fiber substitute material proved completely unsatisfactory; threads for journal-box waste of specified tensile strength have not been located in commercial supply but the problem is being studied.

The survey of hot boxes in road service, conducted by the A.A.R. Mechanical Research Center in conjunction with 14 member roads, has been completed and a preliminary report prepared which is being studied by the appropriate committee.

MECHANICAL RESEARCH PROJECTS CARRIED OVER INTO 1954

Hot-Box Research
- (a) Road studies
- (b) Bearing designs
- (c) Bearing metals
- (d) Treatments of present waste
- (e) New synthetic waste (Nylon, Orlon)
- (f) Special treatments of waste
- (g) Lubricating pads (waste substitutes)
- (h) Mechanical lubricating devices
- (i) Additives for oil
- (j) New methods of servicing boxes

Axle Research
- (a) Fatigue testing at Canton laboratory
- (b) Tests to show permissible overheating
- (c) Effect of copper penetration on fatigue

Journal-Bearing Development
- (a) Testing and study of new designs
- (b) Road tests of ventilated journal bearings

Stresses in Diesel Locomotive Wheels
- Laboratory stress tests
  - (a) With simulated brake shoe heating
  - (b) With actual brake shoe heating
- (c) Road tests under lateral and vertical loads
- (d) Evaluating loads and forces, all conditions

Impact Tests of Railroad Cars
- (a) To determine cause of tank-car shell failure*
- (b) To discover any weakness in all-welded tank*

Certification Tests
- (a) Certifying and approving equipment parts
- (b) Certifying roller-bearing lubricants

Refrigerator Car Research
- (a) Fire resistant properties of insulation*
- (b) Coatings used as spark shields under cars*
- (c) Tests of improved car drains
- (d) Studies of mechanical cooling equipment

Miscellaneous Tests
- (a) Normalizing side frames to prolong life
- (b) Damage to dressed beef in transit (joint study)
- (c) Tests of insulating materials and coatings*
- (d) Lading damage from materials sprayed on the underside of box-car roofs
- (e) Tests of patented air-hose clamps
- (f) Brake-shoe spark protection devices*
- (g) Brake-beam support vibration tests*
- (h) Corrosion of freight-car trucks
- (i) Life expectancy of freight-truck snubbers
- (j) Brake-cylinder packing cups†
- (k) Brake-cylinder lubrication studies†

* Completed in 1953
† Initiated in 1954

Locomotive Truck Spring Compressors

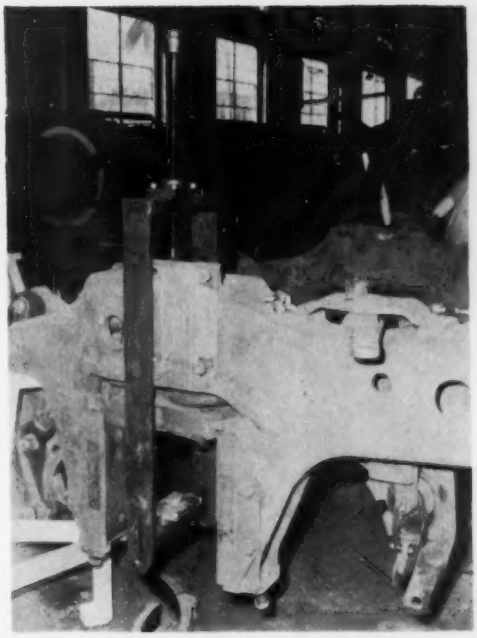
Two arrangements are used by the C&EI to compress elliptic and coil springs on the trucks of GM locomotives. The device for compressing the coil springs is used when either the springs themselves or the pedestal wear shoes require renewal. (See illustrations on facing page.)

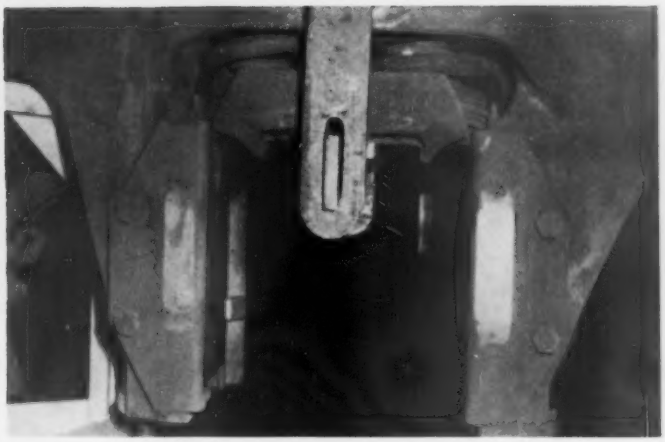
The steel sides of the coil spring compressor are ¾ in. by 3½ in. by 41 in., spaced 14 in. apart and welded to the top member, which is 1½ in. by 3½ in. by 14 in. A center block 1 in. by 5½ in. by the width of the top member is both welded and bolted to it for maximum safety.

The springs are compressed by turning the long bolt with an impact wrench, drawing the removable bottom piece of the jig against the spring keeper. This bolt has 1½-in. buttress thread and a total threaded length of 22½ in. The bottom member is 4 in. by ¾ in. by 14 in. and the dummy spring block attached to the top of it 4 in. by 6 in. by 1 in. The spring group is held compressed until the pedestal wear shoes are assembled, after which the compressor is gradually released and removed.

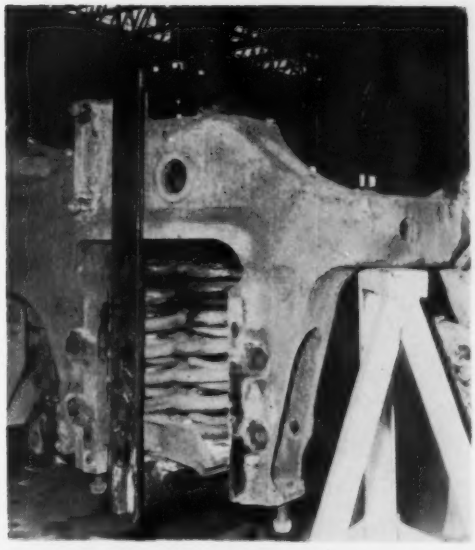
The device for compressing the elliptic springs has two members made of ½-in. boiler plate with a height of 15 in., a maximum width of 8 in. and shaped as shown in the illustration. The block between the bottom of the bolt and the spring leaf is 4 in. long and 1½ in. square, the pins 1 in. by 5 in. The tightening screw has 1¼-in. buttress thread and a threaded length of 7½ in. The elliptic springs are compressed by turning the screw with an open end wrench and a 3-ft. handle. With the springs compressed, the load is removed from the swing hanger pin, permitting easy removal of the pin to drop the swing hanger down.

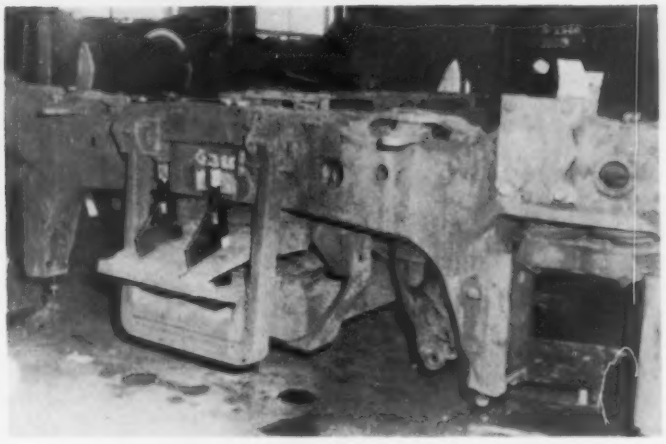
The compressing device is removed when the springs are to be worked on by putting the springs under a hydraulic press, taking the load off the pins that fit through the holes in the bottom of the jig. To apply elliptic springs, they are compressed in a hydraulic press and held in the compressed position by the application of this jig. After application to the locomotive, the spring compression is released by loosening the bolts and the jig removed.





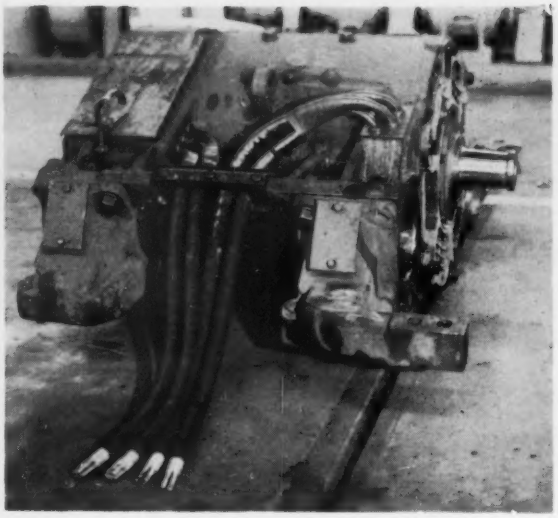
Left: Device for compressing coil springs for application or removal of the springs or the pedestal wear shoes. Above: The springs are held compressed sufficiently to take the load off the wear shoes for removal or application. Below left: With the shoes removed, the compressor raises the spring for application or lowers it for removal.





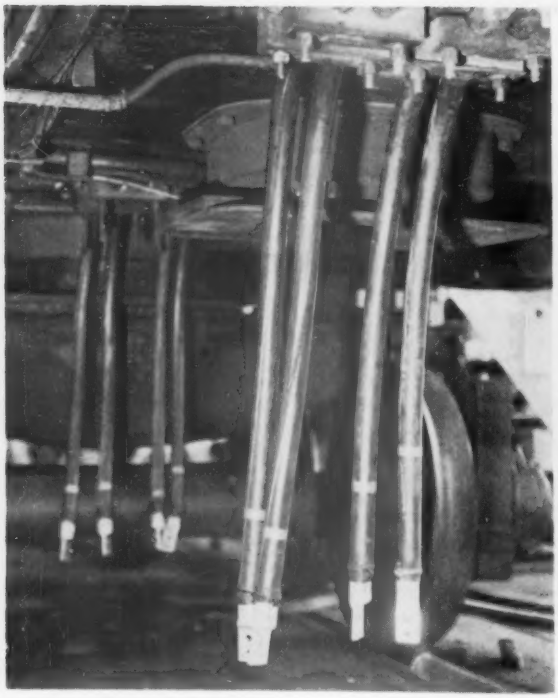
Above: Leaf springs are compresed to unload the swing-hanger pins and permit dropping the spring hanger. Below left: Using two screw clamps which are tightened with an open-end wrench and a 3-ft. handle. Below right: The screw clamp. Pressure block at left goes on top of spring, and pin at right goes under.

ELECTRICAL SECTION



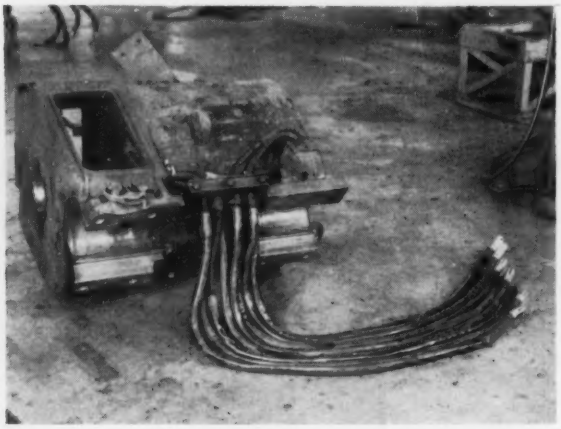
Left: Applying a sleeve to the connection between two parallel motor connections and one of the larger motor leads.
Right: An overhauled motor unit with four leads.

Rewiring Baldwin-Westinghouse Locomotives

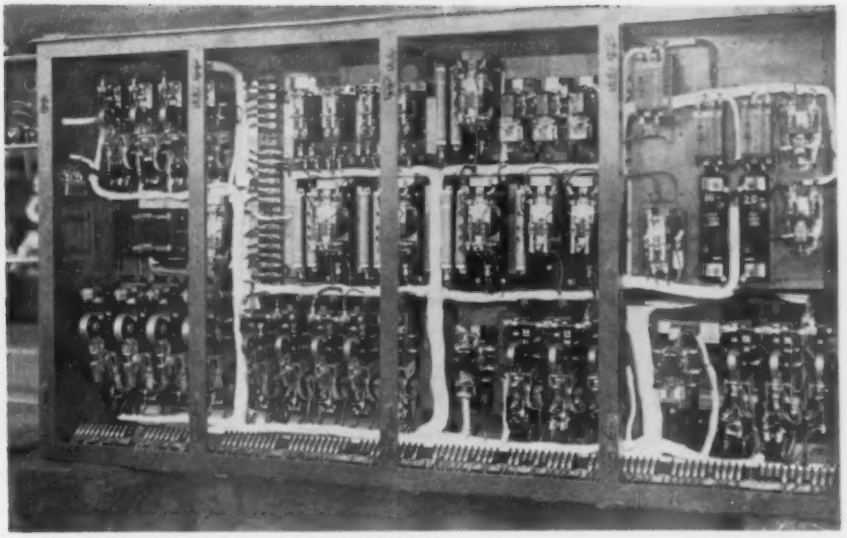


THE SEABOARD Air Line is now in the process of rewiring some of its Baldwin-Westinghouse diesel-electric locomotives. The operation is characterized by the making of several changes in the original layout.

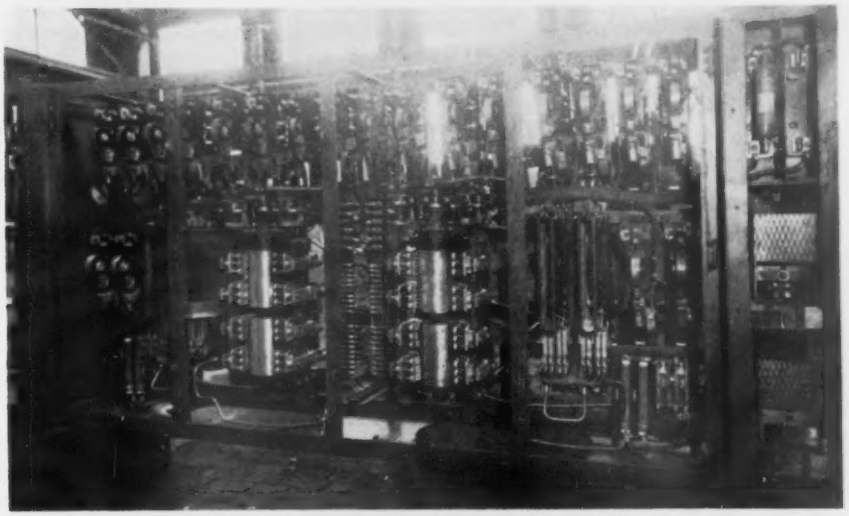
When the locomotives were built, there were eight



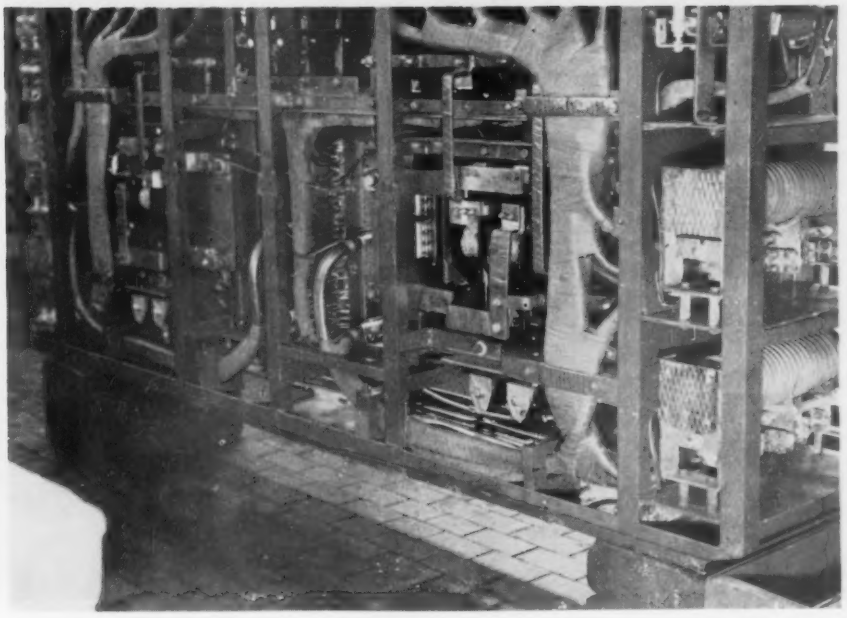
Left: View under the locomotive showing the leads coming down from the high-voltage cabinet at two motor positions. The locomotive is standing on shop trucks.
Right: One of the original motors with its eight leads.



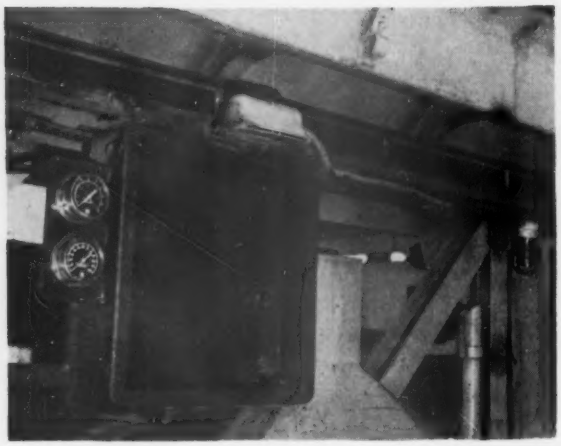
The control cabinet as reworked, ready for replacement in the locomotive.

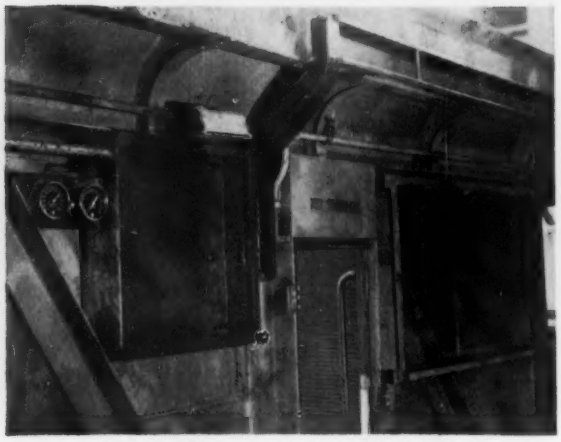


Front view of the overhauled high-voltage cabinet.



Rear view of the high-voltage cabinet.





Left: A rectangular hole in the top of the cabinet allows for wires coming in from the duct. The vapor-proof lighting fixture is mounted on the bottom of the duct and the panel light is connected through flexible conduit.
Right: One of the side-wall cabinets and a run of duct connecting with the cabinet.

leads from each motor, two cables in parallel for each of the four motor connections. Similarly, there were eight leads from the high-voltage cabinet to connect with the eight motor leads.

In the place of the eight motor leads there are now four. Each of the four new motor leads have a c.m. cross-section which is slightly greater than the combined section of the two original leads. This was done because a single conductor does not dissipate heat quite as readily as do two of half the section.

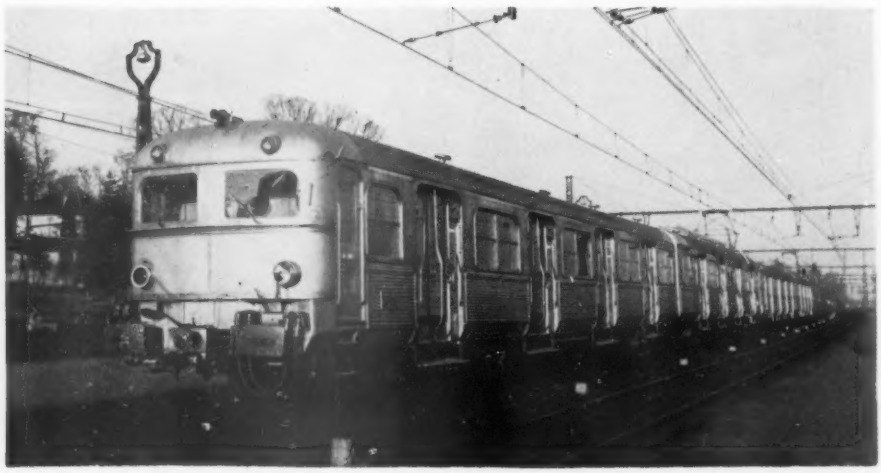
The change to the larger size cable is made close to the motors—between the lead block and the motor. The ends of both the large and small cables are opened and meshed together. Then a copper sleeve is put around the joint and the joint is soldered by means of a torch with 95 per cent tin—5 per cent antimony solder. Finally, the joint is taped and the leads clamped in a four-hole. Instead of an eight-hole, block. Cables of the larger size are also run from the high-voltage cabinet to connect with the motor leads.

Conduit Replaced by Duct

Both high and low-voltage cabinets are reworked and completely rewired. Control circuits and lighting circuits in the locomotive body are all run in duct instead of conduit. The duct which is made of 16-gage steel is 3 in. by 5 in. in section, and the open front is flanged. The flat duct cover, which is applied after all wires are in place, is secured with cap screws threaded into the duct flange.

The duct was fabricated in the railroad shop and welded into position in the locomotive. Insofar as possible, it is placed at the top of the side wall against the ceiling of the locomotive, away from the dirt and oil which accumulates on and near the floor.

Electrical cabinets on the side walls are also placed as high as possible and welded to the duct. Most of the lighting fixtures are mounted on the underside of the duct. Flexible metal conduit is used where necessary between the duct and the lighting unit.



A new type of electric multiple-unit car train was placed in service on the suburban lines southeast of Paris, March 11, 1954. These trains are designed for speeds up to 75 m.p.h. The four double, sliding doors on each side of the car are said to make it possible to empty a loaded car in less than one minute.

Diesel Failure Caused by Dead Battery

By Gordon Taylor

It wasn't raining when Noah built the Ark. But, you see, old Noah was a very careful and cautious fellow. He didn't wait for trouble to strike him. He prevented trouble before it had a chance to happen. If all our maintainers and enginemen would copy Noah's plan, or would follow instructions, it would not be necessary for me to write this one.

It happened this way. An Alco road switcher (1,500 hp.) was being prepared for service when it was found to have a dead battery. It was necessary to use cables from another locomotive to crank the engine. After getting the engine started and seeing that the battery was starting to charge, the unit was dispatched for service. (That was the first mistake; more about that later.)

After the unit left the yard and had proceeded about four miles, the crew discovered that the battery was not charging. Did they call for help to get battery charging re-established? No, they apparently had a date to meet a failure, so they proceeded and met the failure about 30 miles out of town. It occurred in a town where the dead diesel and its train blocked a street crossing until help could be sent 30 miles in an automobile.

Fortunately, there happened to be another locomotive in the town where the failure occurred. The electrician who answered the call was able to restart the engine by using cables connected to the other locomotive. The electrician then closed the circuit breaker and started the battery charging again.

This article is based on actual experiences of men who operate and maintain diesel-electric locomotives.

To Electricians and Inspectors

When it becomes necessary to crank an engine with a cable because of a dead battery, the unit should not be released until the battery is charging at normal rate.

When a dead battery is first put on charge, the rate is extremely high, due to the fact that the battery has no voltage to oppose the applied voltage. As the battery becomes charged, its voltage rises to a point that limits the flow of charging current, and on a fully charged battery hardly any current will flow.

When a dead battery on a diesel is first starting to recharge, the speed of the engine should be held down to about one-third or one-fourth throttle until the battery receives enough charge to start reducing the charging rate shown on ammeter.

In this case the unit was released before the battery had received sufficient charge. Then when the unit was placed immediately in service and the engineman moved the throttle out to full throttle position, the charging rate probably reached 200 amp. or more. That amount of charging current opened the circuit breaker on the Alco —it would have blown the auxiliary generator fuse on an E.M.D.

This failure must be considered a man failure, as the unit was not in proper condition to be dispatched.

Suggestions for Enginemen

When a battery on a single-unit locomotive is not charging, there is trouble ahead unless charging can be restored.

Records show that most cases of this kind originate on units leaving a terminal after several hours layover. Enginemen should pay particular attention to see that the battery is properly charging when they leave the terminal. If any unusual condition is observed, an electrician should be called immediately, and the engineman should be certain that the battery is charging at a normal rate before he leaves town.

In the case described, the crew observed that the battery was not charging at a station four miles from the starting point. Right there is where the crew should have called for help. It would have been a great deal easier to have sent an electrician four miles, than it was later to have to send him 30 miles.

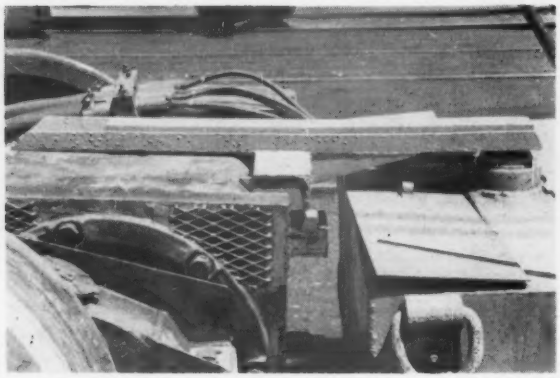
Remember, the battery is practically the heart of the diesel. You cannot proceed very far if the battery is not charging; especially, in the case of a single-unit diesel. If you persist in moving a diesel farther from help with a dying battery, you are headed for trouble.

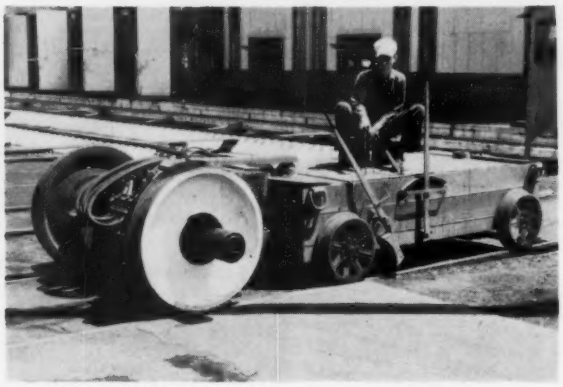
The same advice applies in the case of a failing battery

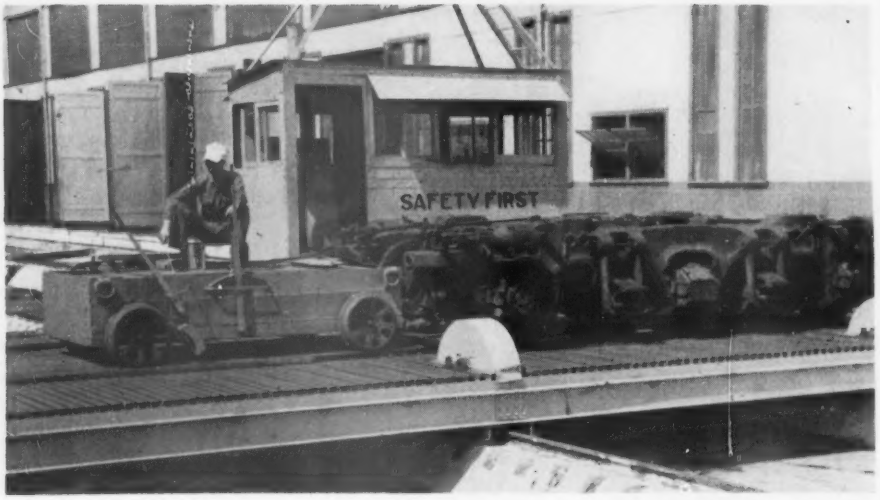
on one unit of a multi-unit combination. You do have a better chance to continue the trip where you have several units, because you can set up control voltage from the rear or trailing A unit. However, the best advice is to see that all batteries are charging at proper rate before you leave the terminal.

Also have your road foreman show you how to re-set the battery charging circuit breaker on an Alco, and how to replace the auxiliary generator fuses on an E.M.D. That information may enable you to meet an emergency if you should be unable to get hold of an electrician.

If you will contact enginemen in your district and see that they understand the importance of checking battery charging, and that they know how to re-set circuit breakers on Alco locomotives, this particular trouble should never happen. Some men do not know that it is necessary to push the circuit breaker handle past the *Off Position* in order to engage the re-set mechanism.







Upper left: The hitch or coupling used between the car and the motor when a single motor is to be moved.

Upper right: The car is self-propelled, but when used to move a traction motor and axle, the traction motor is driven from the car battery and provides the motive power.

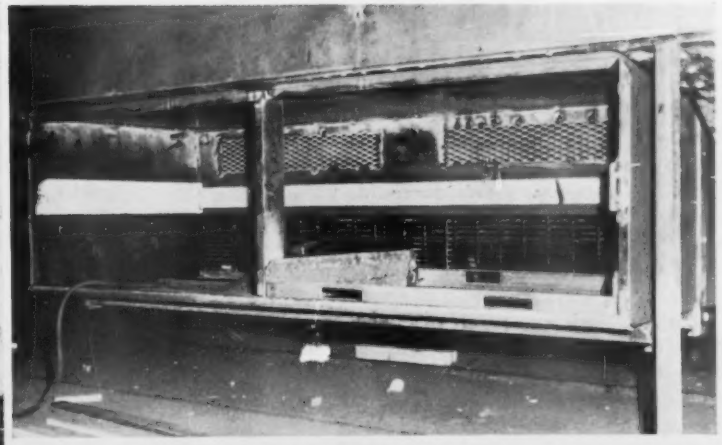
Left: When a complete truck is moved, the car battery supplies current to both of the motors on the truck.

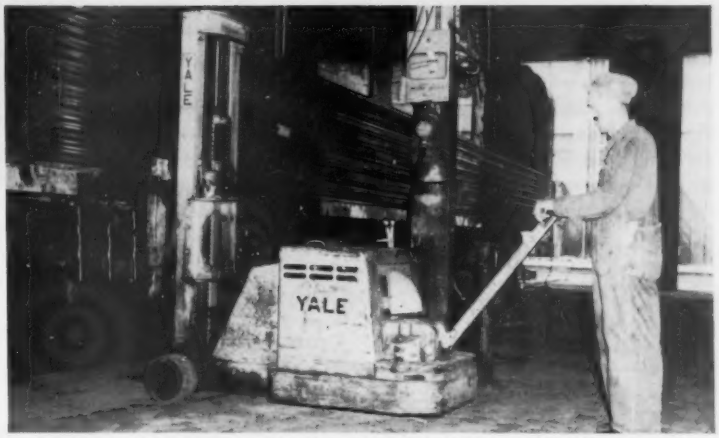
Motor and Truck Mover

In nearly all diesel-locomotive repair shops, it is necessary at times to move locomotive trucks, or traction motors with their axles over considerable distances from one point in the shop to another. To provide for this requirement, the self-propelled car shown in the illustrations was designed and built from scrap material in the Jacksonville, Fla., shops of the Seaboard Air Line.

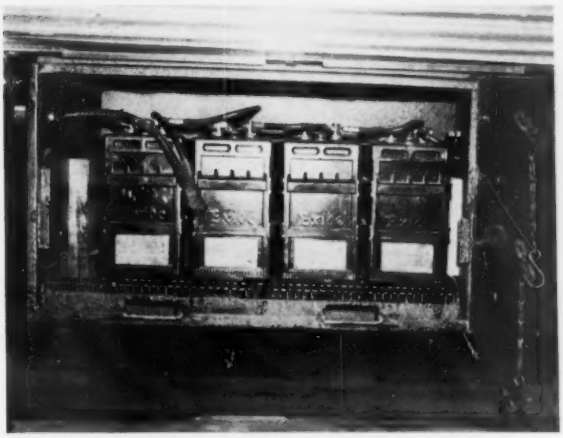
The car which runs on four, flanged, section-car wheels is powered by a 32-volt lead storage battery taken from a diesel locomotive after it had lost too much capacity to serve longer as a starting battery. To propel the car alone, it is belt-driven by an obsolete 5-hp. motor taken from a locomotive steam generator. The belt drive is the same as that used in section cars. The car is controlled by a foot switch and an old, salvaged locomotive reverser. The belt is allowed to slip during acceleration. A hand brake on one wheel is used to stop the car.

When a single motor with its axle are to be moved, the motor is coupled to the car with the hitch shown in one of the illustrations. In this application, the motor leads are connected to the reverser and the contactor terminals by jumpers which are a part of the car equipment. The traction motor then furnishes the tractive force. When a complete truck is to be moved, both of the truck motors are connected in parallel by means of jumpers and are connected to the reverser and contactor terminals in the same manner as that used for a single motor.





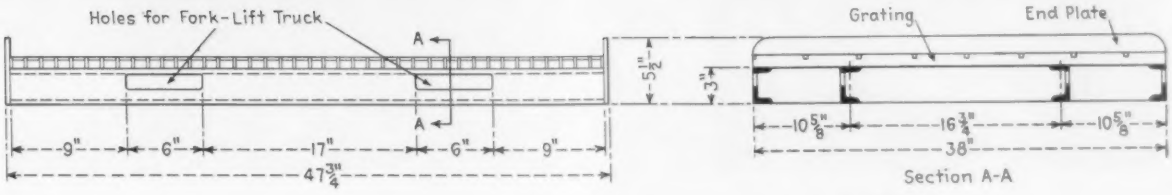
Above: The forks slip through each pair of slots on all four channels to lift the bottom and its batteries evenly.
Upper right: Once the bottom is removed, it and its batteries are delivered direct to the battery room for servicing.
Lower right: The bottom during construction showing two of the four channels and the slots engaged by the forks of the truck.
Below: Battery box removable bottom which simplifies handling, reduces maintenance of box and improves ventilation.



Easy-To-Handle Battery Carrier

The Chicago & Eastern Illinois has designed a removable bottom for its passenger train car battery boxes which greatly simplifies the handling of the batteries, reduces maintenance problems on the battery box itself, and gives improved ventilation. Two are used per car.

The removable battery box bottom is so constructed that a fork lift truck can remove the bottom with a half car set of batteries in place and deposit the bottom plus the batteries in the battery room without intermediate handling. When repairs to the battery have been completed, the fork truck again picks up the tray, carries it and its batteries to the car, and places this load directly



Detail of all-welded removable battery box bottom. Each bottom supports four battery trays.

in operating position on the car. Removal of the batteries from the combination tray and bottom for loading or unloading is completely unnecessary.

The removable bottoms, two of which are required for a battery box, consists of four 3-in. channels 47¾ in. long with the channels spaced as shown in Section A-A of the drawing. Blaw-Knox J-27 grating is welded to the top of the channels to form the resting place for the battery set. The channels are joined on either end to a steel plate ⅜ in. by 5½ in. by 38 in. with rounded corners. The over-all length of the bottom, including these end plates, is 48½ in.

Each of the four channels has two slots 1 5/16 in. by 6 in., through which the forks of the lift truck extend to raise the bottom and its batteries. The forks thus extend all the way through the four strength members to support the bottom and its batteries evenly.

The removable bottom rests on the battery box angle iron. To lift it out of place, a fork truck is run up to the location, the forks raised to the height of the slots, the truck moved forward to insert the truck forks in the slots, the removable bottom raised a few inches to clear the angle iron on which the bottom rests and the truck carefully backed out of the area to remove the bottom and its batteries from the box. The entire load is then carried directly to the battery room for inspection and servicing. The reconditioned set of batteries is loaded by reversing this procedure.

D. C. for High-Potential Testing

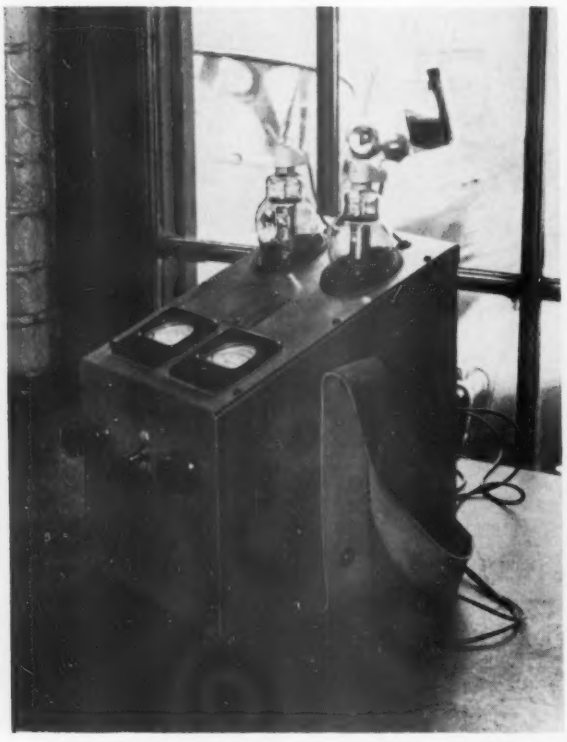
The Milwaukee makes its own equipment for high-potential testing of electrical equipment in its shops at Milwaukee, Wisconsin. The test kits which are portable (carried on a strap) produce d.c. voltages up to 2,000. Tests are made in the same manner as with a.c. hi-pot testers and shop reports show they accomplish the same purpose with less breakdown of insulation.

The test kits are operated from 220-volt a.c. power, and this voltage is stepped up by means of a transformer having a 115/230-volt primary and an 1880/1520 secondary. It is then rectified by two No. 866 rectifier tubes. Filament voltage for the tubes is supplied by a second transformer having a 115-volt primary and a 2.5-volt secondary. Voltage is controlled by a rheostat in the primary circuit of the high-voltage transformer.

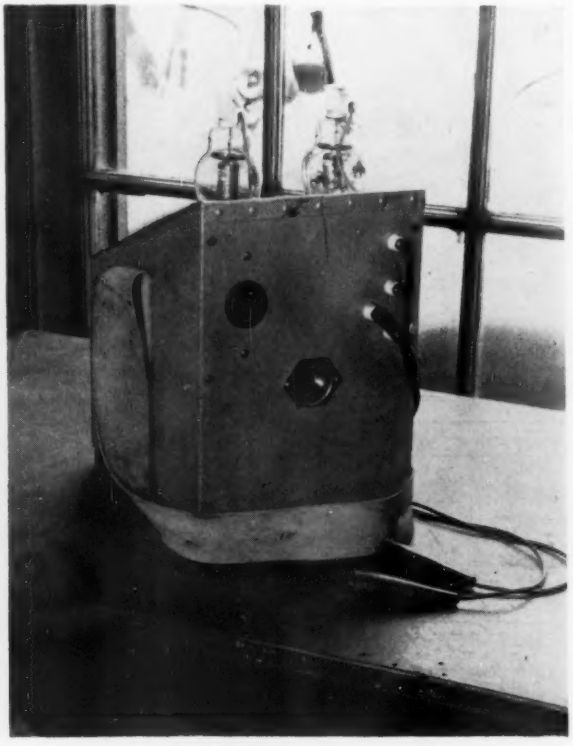
A 1-mf., 2,000-volt condenser is connected across the circuit in parallel with the test leads. In case of a breakdown, the discharge from the condenser provides a visible indication of the location of the break without causing a damaging burn.

The left-hand instrument on the kit reads in voltage applied to the high-voltage terminals. The right-hand instrument is a millivoltmeter operated by a 1½-volt flashlight battery. It is used for checking locomotive instrument operation. The current is controlled by a rheostat.

In operation, full-scale current is applied, with the millivoltmeter in parallel with the instrument under test, and the current checked on the millivoltmeter. An extra set of test leads is plugged into a receptacle in the back of the kit when these tests are made.



Meter on the left reads in volts applied to the hi-pot terminals and the one on the right in milliamperes for testing instruments. Voltage and current values are controlled by the rheostat knobs.



Back view of the test kit showing the high-potential test clips on the bench and the receptacle in the center of the back panel for making instrument tests.

DIESEL-ELECTRICS—How to Keep 'Em Rolling

24 The A, B, C of Flashovers

There are three basic reasons for flashovers — and the best way to avoid damage caused by flashovers is to stop them before they happen

FLASHOVERS are caused! They don't just happen. Something seems puzzling and mysterious only if we don't understand it. As we gain knowledge the mystery disappears. Let's face it, flashovers are no different. So when we find out what they are and how they are caused, what to do to prevent them will make sense.

A generator flashover, seen for the first time, is truly awesome. The blast of fire, the smoke and noise are enough to make one jump as if it were a stroke of lightning. A traction motor flashover is also spectacular, but being under the locomotive, it is seldom seen or heard. Both are caused in much the same way, so if you understand one you will understand the other.

In the February 1954 issue we stated that Part 23 was the final article of the series. Since then, it was decided that the series would not be complete without a chapter on "flashovers". We believe this will be the concluding chapter. This article is written by J. W. Teker, Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.

Setting the Stage

Look to the commutator of a motor or generator for the flashover just as you look to the sky for lightning. The commutator surface is the stage on which the flash-

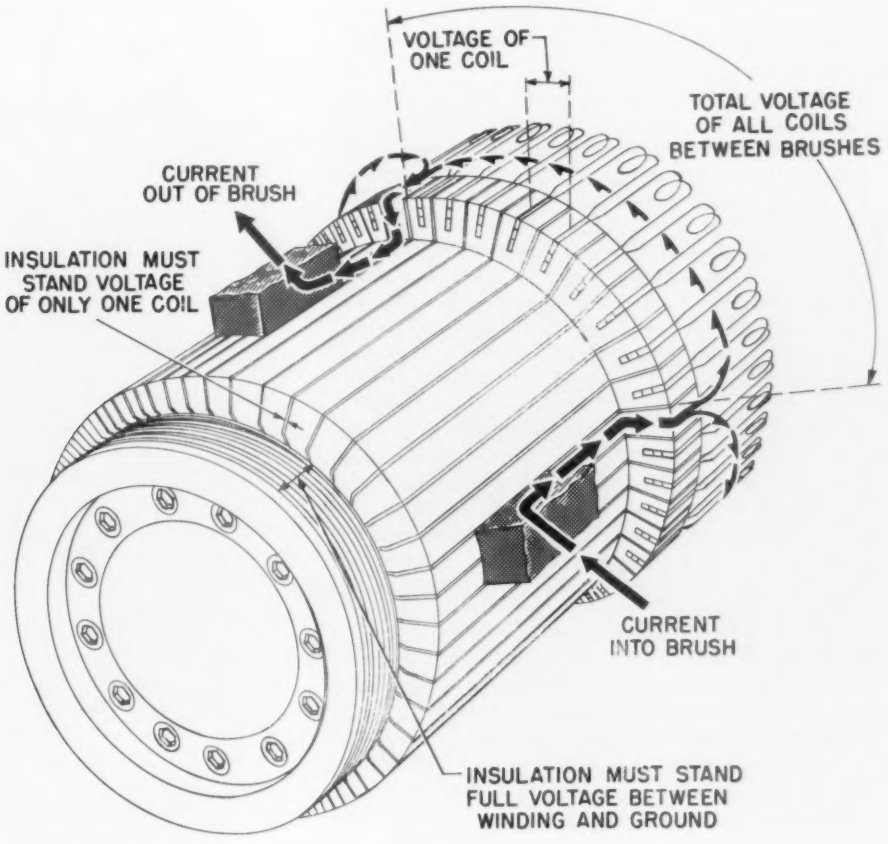


Fig. 1—Diagrammatic sketch of a commutator showing connection of armature coils and path of curent flow.

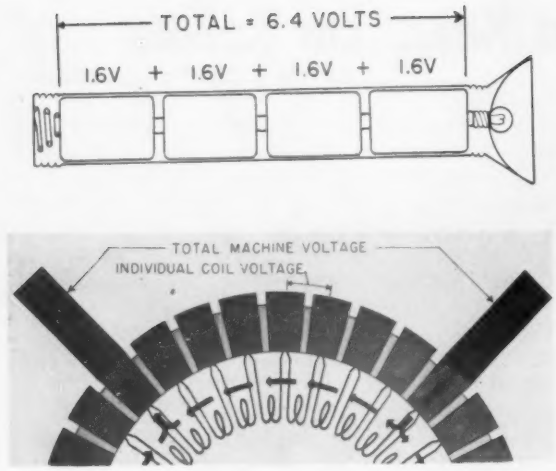


Fig. 2—Voltages in the armature coils add (like voltages of flashlight cells) to make up total machine voltage between brushes.

over appears. Let's examine it carefully. Figure 1 shows how the commutator is built up of copper segments separated from each other by thickness of mica. The armature winding is out of sight under the bands and core slot wedges. It is connected coil by coil to the commutator segments. Each pair of segments has an armature coil connected between them. Electricity is the actor. It enters by way of one set of brushes, flows through the copper segments under the brush, and into the winding. It moves from segment to segment through coil after coil. When it reaches the segments under the other set of brushes, it leaves. The mica insulation separates the copper segments and keeps the electricity on the job, flowing through the armature coils.

Good insulation between commutator segments is what keeps the machine working. If this insulation breaks down, electricity will short-cut across the surface of the commutator instead of going through the winding. Almost instantly the current jumps from brush holder to brush holder with explosive force. This is called a flashover.

Let's study the vital insulating space between commutator segments more closely. The total operating voltage of a motor or generator armature shows up between each pair of adjacent brush holders. This voltage is divided up between the coils of the armature windings, so each coil handles only a small part of the total. Since each coil is connected to a pair of segments, the voltage between them is only that of a single coil. Hence, the mica between segments has to insulate against only the small voltage of one coil. This is very much like your flashlight, Fig. 2. The cells are connected in series so that each adds its voltage to the next to give the total voltage on the lamp. In the same way, the small voltages between segments add up to give the total voltage at the brushes.

What's the Trouble?

The voltage between segments is normally quite low. A thin piece of paper can hold such voltage. Yet the space between the segments is actually separated by a piece of mica many times thicker than a sheet of paper. What then causes such relatively wide spaces to break down and permit a machine to flashover?

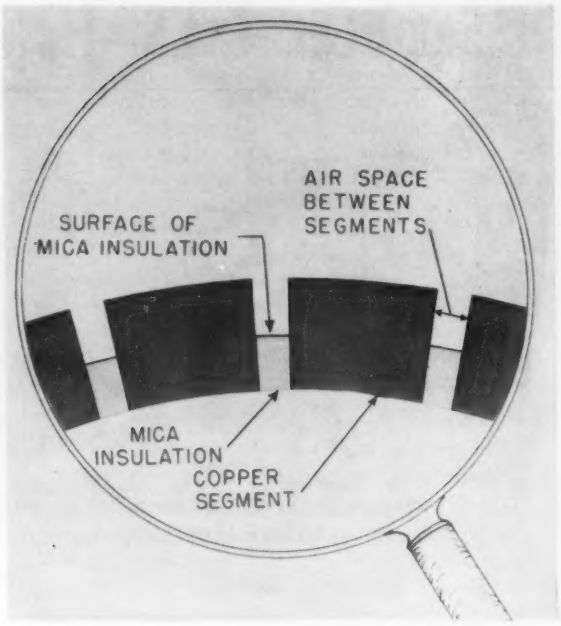


Fig. 3—How the copper segments of the commutator are insulated from each other.

Let's magnify this insulating space (Fig. 3) to clearly see the thickness of mica separating the segments. Notice the surface across the top of the mica and the air space between the segments. Rarely anything happens to di-

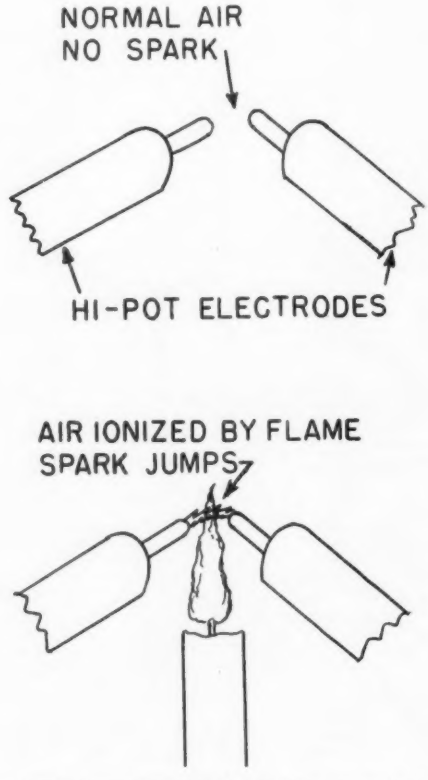


Fig. 4—Simple demonstration of how a flame can make air conduct electricity by ionization.

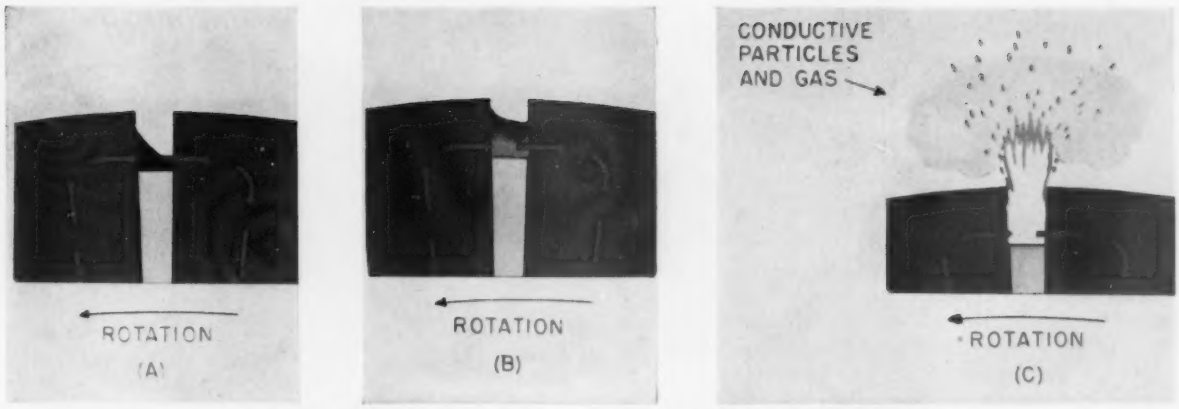


Fig. 5—Dirt bridges the space between commutator segments and current begins to leak across (A); as the dirt heats up, more current flows (B); finally the spot between segments begins to glow and sizzle (C); it then erupts a cloud of conductive particles and gas.

rectly puncture the heavy thickness of mica between segments. However, dirt does collect on its surface. As this dirt packs into the space between the segments, current begins to leak through it. The space is made wide so it will take longer to fill with dirt and be harder to bridge. If the space is not cleaned in time, breakdown and flashover may result. This insulating space may also be bridged by slivers of copper or copper dust left over from stoning and resurfacing the commutator.

Dirt and foreign particles are not the only causes of flashovers. New machines in good clean condition have been known to flash over. In such a case the space between segments is not bridged by dirt, dust or metallic particles. What then causes this insulation to break down? If the space is clean, then something must happen to the air in the space to change it to a conductor—but how?

We know that many good insulators change to conductors when burned or charred by intense heat. This is what happens to air. It can be broken down into a conductive gas by the action of intense heat. Arc welding is a common example. Intense heat is generated at the point where the welder strikes his arc. The blinding hot spark that follows is electricity flowing across the air space. This change of air to a conductive gas is called "ionization." It can be caused by a flame or spark, by high voltage or by certain kinds of radiation.

Ionization can be demonstrated with a high-potential test set. The electrodes should be separated just far enough (Fig. 4) to keep the high voltage from jumping across the air gap. Now, if a flame is brought into the gap an arc will jump between the electrodes. The flame has "ionized" the air and made it a conductor. (If you try this, be sure to use a wax candle or other insulated flame so you won't get a jolt from the hi-pot set.)

Under certain operating conditions motor or generator brushes will spark. The effect of this is not always serious. What happens depends upon how intense the sparking is and how long it lasts. Under some abnormal conditions, the spark at the brush may be so vicious and hot that it blasts a cloud of conductive gas (ionized air) and fiery particles across the commutator surface. This bridges the insulating spaces between segments, and electricity short-cuts across the surface of the commutator. Everything is then set for a flashover. The intense spark that sets off a flashover may occur when a brush bounces off the commutator while the machine is carrying a load. It may also occur when there is a sudden extreme change in load, far greater than the machine can handle.

Let's sum up. When the insulating spaces between segments are broken down or bridged, electricity short-cuts across the commutator surface. Instead of doing its job in the armature winding, the energy goes into the violent explosion of a flashover. These vital insulating spaces may be bridged by hot conductive gases (ionization) generated by the intense heat resulting from:

A—Dirt between segments which burns when current flows through it.

B—Loss of contact between brushes and commutator which draws a hot spark.

C—Intense sparking at the brushes caused by sudden extreme load changes.

Let's study these simple A, B, C's of flashovers one at a time.

Dirt—the Villain

Dirt and foreign particles in the insulating space between commutator segments cause the majority of flashovers. Yet the condition of this insulation is most likely to be overlooked. When enough dirt collects to bridge the space between segments, current begins to leak across, Fig. 5A. The dirt heats and fuses into a better path. Current flow increases, especially as the operating voltage is increased. The spot grows hotter, and finally begins to glow, Fig. 5B. As the commutator turns, this glowing spot looks like a continuous ring of fire—that's why it is called "ring fire." Finally the spot gets white hot. Then it erupts conductive gases and incandescent particles, Fig. 5C. As the commutator turns (Fig. 6A), these form a fiery trail behind the spot like a comet's tail. This breaks down the insulating air space between segments that may not be glowing and sets the stage for the next act.

The current short-cuts (Fig. 6B) from the hot spot, across the segments bridged by the fiery gases, back to the brush holder in a sizzling, vicious spark. The intense heat and energy in this spark blast conductive gases across the commutator surface (Fig. 6C) with explosive violence. The gas cloud races ahead of the glowing spot and breaks down the air resistance across the rest of the commutator from brush to brush. Then the full power of the machine jumps across (Fig. 6D) in the final flashover.

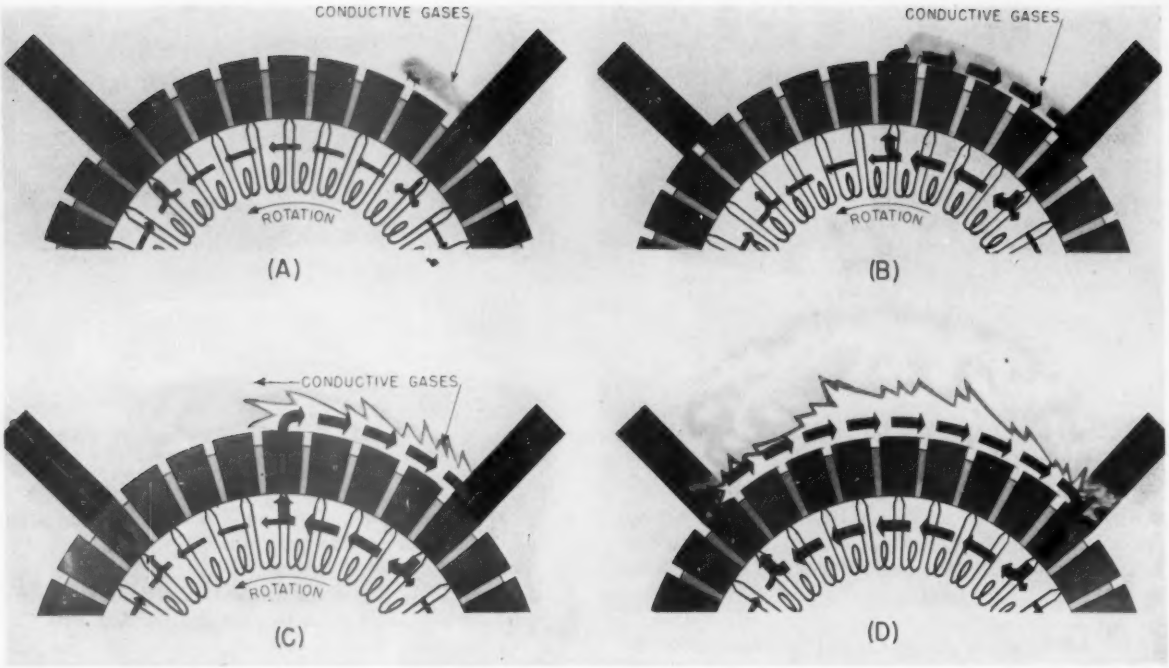


Fig. 6—As the erupting spot turns with the commutator it leaves a trail of conductive gas behind it (A); current short-cuts through this gas cloud back to the brush (B); this blasts gas over the commutator surface to the opposite brush (C); Current then arcs across the commutator surface through the conductive gas from brush to brush (D) forming the flashover.

Finding and Routing the Villain

What can be done about this dirt between commutator segments? An ounce of prevention is surely worth a pound of cure here. It would be a big help if you could check the insulation resistance of the spaces between commutator segments before flashover occurs. How can you do this? It can't be measured directly because, as you remember, these spaces are bridged by the armature coils that are connected between segments. Megger readings and hi-pot tests are no good because they check what is called "resistance to ground." This is the resistance of the insulation separating the electrical parts from the frame and other grounded parts. This insulation is important, but has nothing to do with the spaces between commutator segments where flashovers start.

You can make a fair check by looking down into the spaces between segments. A good light will help you to see whether there is dirt there. Clean, freshly under-cut mica looks white or gray. Dirt has a dark color. Remember to look for copper dust and copper slivers as well.

The air cure process, described in Part 4 of this series, is even better. A jet of compressed air is blown on the commutator as it rotates with voltage on it. The air blows loose dirt out of the spaces between segments. It also packs down the particles that are not blown out. This lowers the resistance of the path and allows more current to leak across. This current, escaping across such paths, twinkles under the air jet as the commutator spins. As the current burns the dirt out the compressed air blows away any conductive gases that might be formed. Begin air curing at low voltage and play the air jet on the commutator until twinkling stops. Increase the voltage notch by notch, repeating the curing at each notch, until full voltage and speed are reached. Periodic curing will go a long way toward reducing the frequency of flashovers. Best of all it is easy to do. Wear gloves and goggles for protection in case of an accidental flashover. If you remember safety first you have nothing to fear.

You may find stubborn dirt spots which refuse to move under the action of the air jet. Then you will have to stop the machine and dig or scrape them out by hand. Do this until all commutator segment insulating spaces are clean.

Another Enemy—Loss of Contact

Dirt may be the most frequent, but it is not the only cause of flashovers. Sometimes loss of brush contact will be to blame. This may be expected at high speeds with a rough commutator or weak brush holder springs. It may also occur when brushes are jammed in the holders by muck or dirt so that they cannot follow the commutator surface quickly enough. Severe mechanical shock may jar the brush off the commutator.

If the brush breaks contact with the commutator it draws an electric arc, Fig. 7. If this arc is severe enough it will spread conductive gases over the commutator. Again the stage is set. If the fiery gas bridges enough segments, the collective voltage will cause the current to arc back to the brush, Fig. 6B. The blast of conductive gas from this arc-back may reach across the surface of the commutator to the next brush, Fig. 6C. The full power of the machine then flashes over this short-cut path, Fig. 6D. Again, instead of doing useful work the energy will be expended in the terrifically hot, destructive blast of the flashover.

When flashovers can be traced to loss of brush contact, corrective steps, such as those outlined in Parts 5 and 10 of this series, should be taken. Also, from time

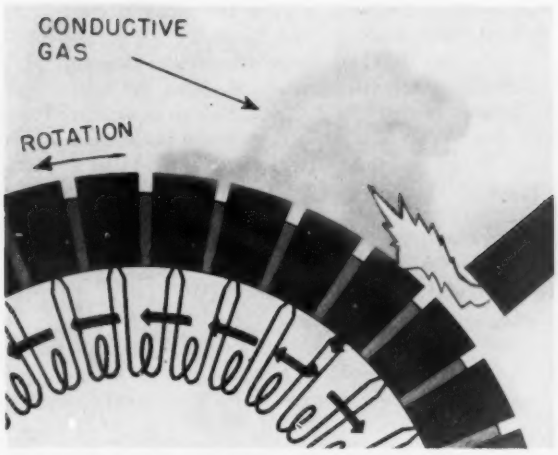


Fig. 7—If the brush loses contact with the commutator surface while the machine is operating under load, a spark will be formed that may be vicious enough to cause a flashover.

The coil will come out from under the brush with the current still flowing in the old direction. The meeting point with the current in the other path (called the "neutral point") will no longer be under the brush. This moving of the "neutral point" crowds the current to one edge of the brush. Then it breaks out over the surface of the commutator in a spark to reach this shifted point, Fig. 8B.

The greater the current, the harder it is to get it all completely reversed as the coil zips under the brush. Machines have interpoles, or commutating poles, to speed up this current reversal and keep the "neutral point" under the brush. These are smaller poles located between the main poles in the motor or generator frame. They do no work outside of helping with the commutation job. The magnetism of these poles builds up a voltage in the armature coils as they pass thru the zone covered by brush contact. This voltage speeds up the current reversal to get it done before the coil leaves the brush contact.

These poles are designed to do a good commutating

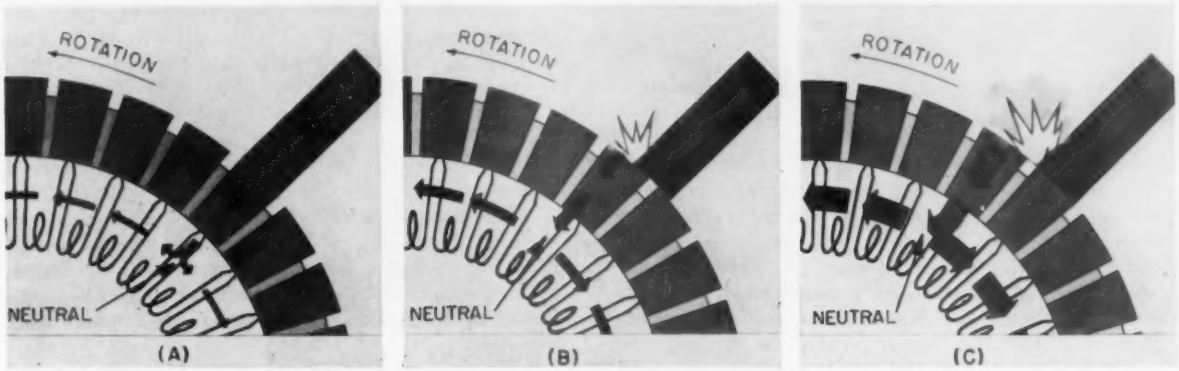


Fig. 8—Sudden extreme overload will cause the neutral point to shift and result in sparking at the brushes. If this is severe enough, it will cause the machine to flash over.

to time check commutator smoothness, and brush-holder springs, and see that brushes are free in carbonways. It's always better to prevent the trouble than to try to cure the damage. In service, reducing power before hitting crossovers at high speed cuts down voltage and lessens the likelihood of flashover if brushes are jolted off the commutator.

The Surprise Attack

Flashovers that occur when the commutator is in perfect mechanical and electrical condition are most perplexing. These are caused by sudden and extreme changes in load much too great for the machine to handle. To see what happens, let's study the current flow through the brushes and armature winding, Fig. 8A. Notice that the current divides as it enters the winding from the commutator. After flowing through the winding it reunites and leaves through the outgoing brush.

Now look at each coil as it passes under the brush. Note that the current flows in one direction when the coil is on one side of the brush and in the opposite direction when it gets to the other side. So the current must reverse in the split second it takes for the coil to pass under the brush. This is called commutation.

What happens if the current doesn't reverse in time? job up to, and even beyond full load. When, however, a very sudden overpowering current flows through the windings, the magnetism in the iron cannot build up quickly enough. It's like suddenly turning on a garden hose—it takes a few seconds to fill before water comes out of the nozzle. This means there isn't enough voltage to reverse the current in time and sparking results. Besides, you can force only so much magnetism through a piece of iron. Then it becomes filled up or "saturated." It's like trying to force more water through the hose than it can handle. Hence, there is a limit to the help the pole can give in reversing the current in the coil. When the current gets so heavy that this help isn't enough, you have more load than the machine can handle and sparking results.

Suppose the jolt of a sudden extreme overload causes vicious sparking at the brushes when the machine is operating at full voltage? Yes! You guessed it. Conductive gas bridges the segments, Fig. 8C. Current arcs back over the commutator surface, Fig. 6B. The blast of fiery gas completes the short circuit between brush holders, Fig. 6C and D. Another flashover is chalked up.

Every day motors and generators demonstrate their ability to take the gaff in tough railroading jobs. What then are the sudden and extreme load changes that cause

Fig. 9—Serious commutator damage resulting from a flashover.

trouble? Evidently they differ from the usual overloads. They are the kind that occur when something goes wrong. For instance, a contactor fails to operate, momentarily short-circuiting the generator. A sudden surge of current occurs during high-speed wheel slip. Taking a crossover at high speed may cause a motor brush to bounce and flash a motor over. When this happens it is just like short-circuiting the generator because the current is no longer flowing through the motor winding, but short-cutting across the commutator. So the current drawn from the generator reaches unreasonably high values. These things occur very suddenly and knock the generator off balance. The heavy sparking and flashover is the knock-out blow.

The Last Act

We have seen the simple A, B, C causes of flashovers. The actual details of flashover behavior are quite complex and it is not necessary to go into them in this article; but they can be resolved into these three classes. These are like three ways of lighting a fuse. No matter which you use—the results will be the same. We've shown how all three causes result in the explosive violence of a flashover. Now let's see what happens during the flashover.

The space surrounding the commutator is filled with flame and conductive gases. These reach between brush holders and also over to the frame part of the machine. Current can now flow from a brush holder to the frame, through the frame and back to the opposite brush holder. This is a second path frequently taken by the flashover current. Burned spots on the frame opposite the commutator and brush holder prove this.

Flashover current can also strike from the commutator surface through the fiery gases to the steel commutator cap. From here it finds its way through the shell to the armature shaft and then to the frame and ground through the armature bearings. This is the cause of electric pitting of roller bearings and races.

When the confined space around the commutator is filled with conductive gases and flame, the electric current can strike in many directions with destructive force, Fig. 9. String bands are burned, brush holders are flashed over, bearings damaged and if grease and dirt are present they may be set afire. However, as soon as the current strikes ground it is detected by the ground relay. This watch dog of the electric circuits trips at once and cuts off generator excitation, so ending the flashover and its destructive consequences.

How It All Adds Up

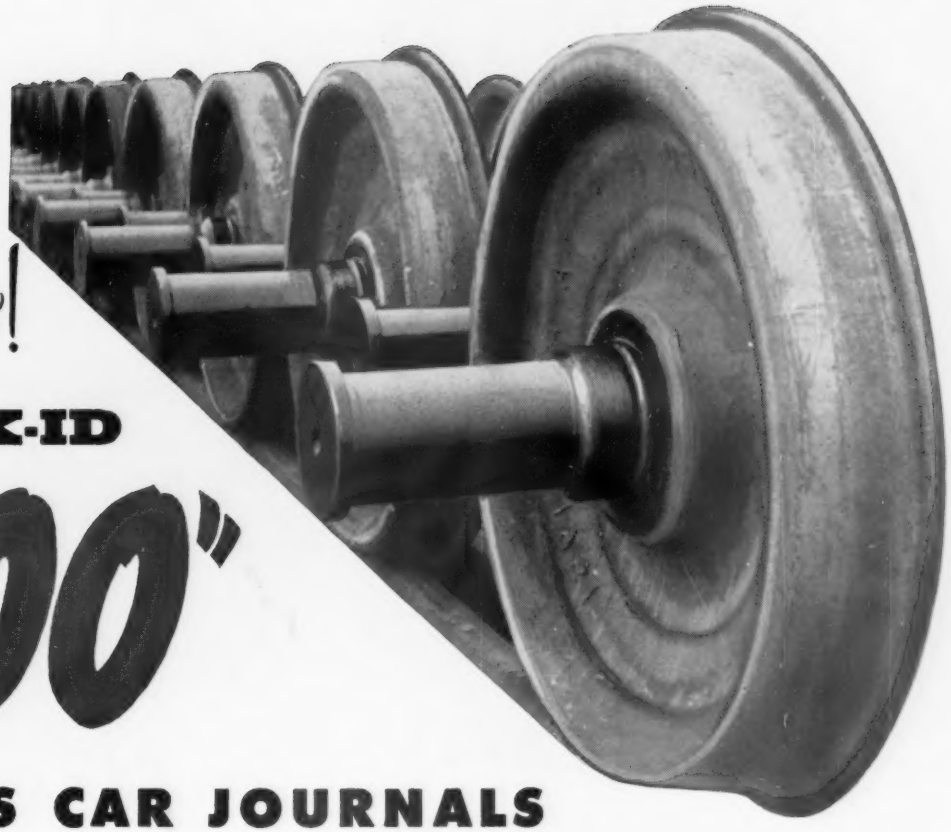
No matter how good the watch dog is in clearing flashovers and reducing damage, it isn't yet good enough to prevent them. Good preventive maintenance will do more than anything else to reduce trouble. Above all, remember the importance of the insulating spaces between commutator segments. No matter how spick and span the rest of the machine may be, if these are not clean you can prepare for repeated flashover trouble. That's why some machines with perfect insulation to ground (megger readings) still flash over. Periodic blowing, or "air curing," up to full speed and voltage pays off in healthy machines.

The mechanical condition of commutators and brush rigging is easily observed and measured as already described in Parts 4 and 10 of this series. You don't need to guess.

When looking for the cause of the trouble don't forget the control and wiring. They may be guilty even though appearing innocent alongside of a flashover-blackened, smoking generator. Also, remember that motors and generators are very much alike and trouble in one may upset the other.

Every flashover has a cause! It doesn't just happen! The smart maintainer will hang on until he gets to the root of the trouble and corrects it. It's much easier and quicker to take simple periodic precautions than to restore the damage done to a machine by a flashover. The right kind of attention in the right place at the right time is what counts.

One frame of a highspeed motion picture showing progression of a flashover across a commutator from the brushes above to those below.



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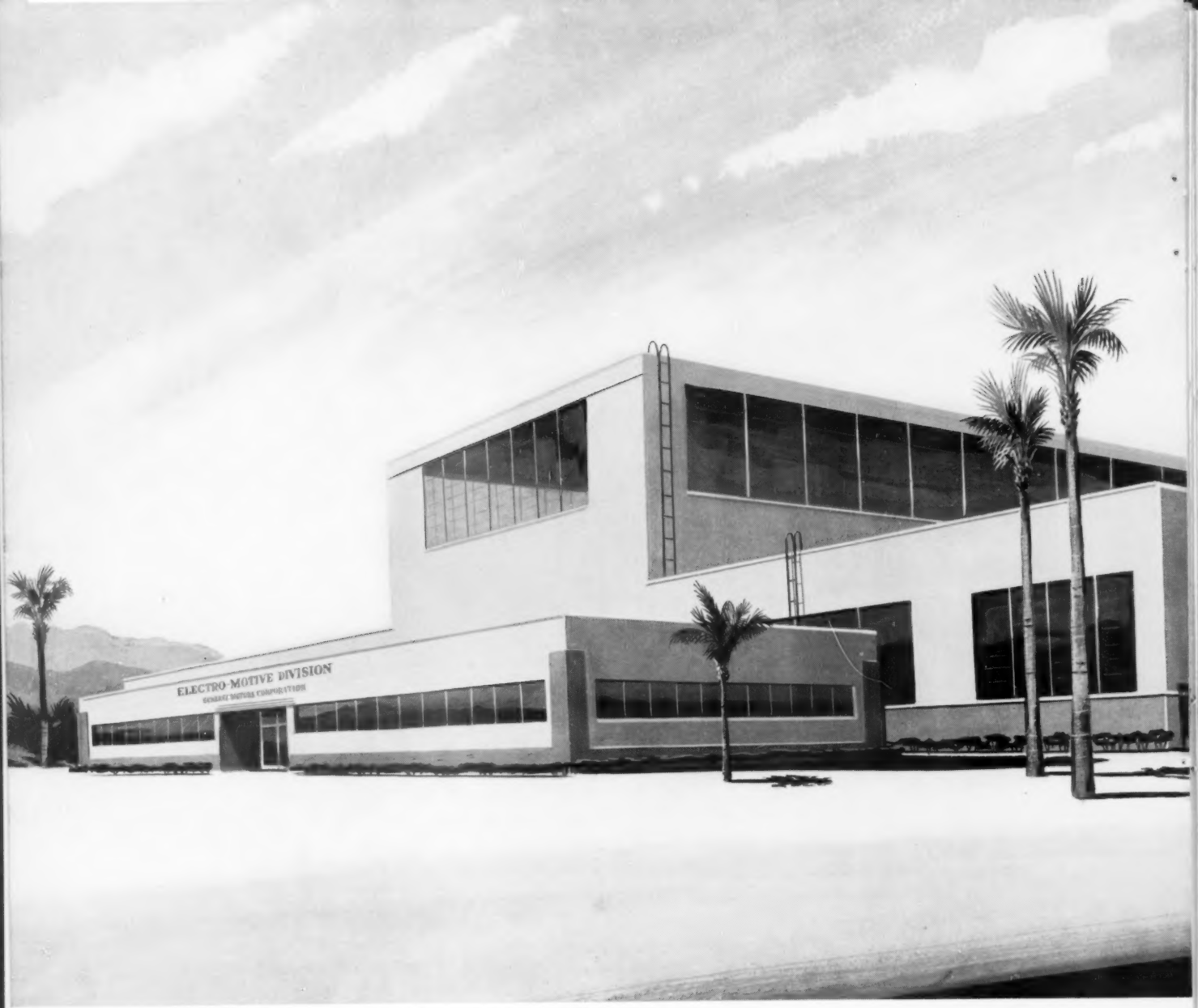

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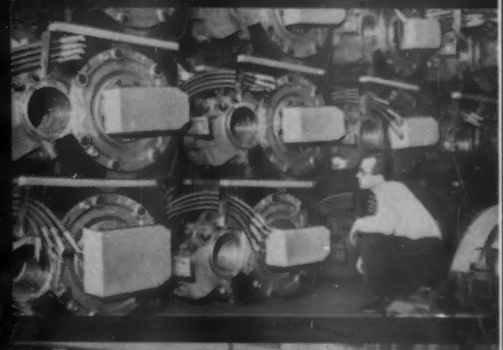

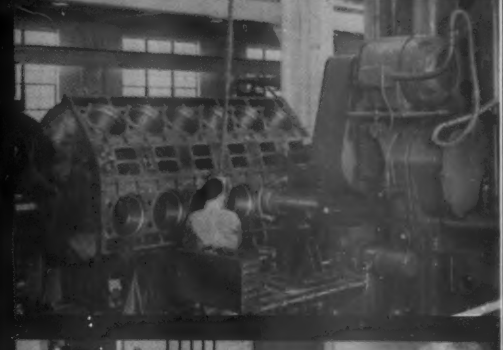

Jacksonville, Florida Branch Tripled in Size

Complete Engine Remanufacturing Facilities Added

TO GIVE Southeastern railroads faster, more complete Unit Exchange service, Electro-Motive has tripled the size of its Jacksonville Factory Branch and added new production-line facilities for remanufacture and *modernization* of General Motors locomotive components.

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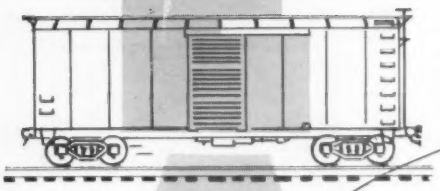

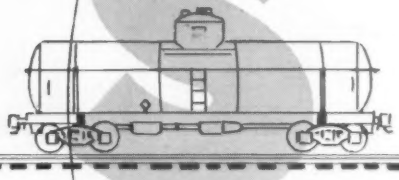

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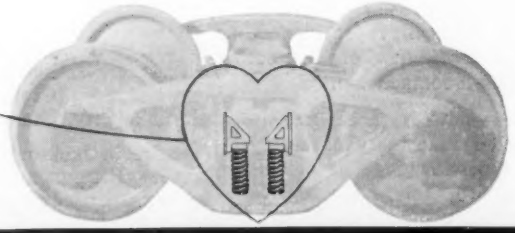

STANDARD CAR TRUCK COMPANY
332 SOUTH MICHIGAN AVE.
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Questions and Answers

Interchange Rules

This is the fifth installment of a new series of questions and answers on the Association of American Railroads Code of Rules Governing the Condition of, and Repairs to, Freight and Passenger Cars for the Interchange of Traffic which may help car men clarify their understanding of the philosophy, intent and requirement of the Interchange Rules. The answers given to the questions are not to be considered interpretations of the rules of Interchange, which can only be rendered by the Arbitration Committee acting officially. The comments, however, will come from a background of intimate association with the application of the rules. Obviously, comments or opinions as of today, may be inapplicable after a revision of the rules or further interpretations by the Arbitration Committee.—Editor.

53-Q.—Where orders are placed during 1954 for the construction of new passenger equipment cars to be delivered on and after January 1, 1955, what consideration should be given as to the types of couplers to be used in such cars?

A.—A.A.R. Standard Type H couplers will be required on all passenger equipment cars other than A.A.R. Class "B" equipment. In the case of Class "B" cars which are otherwise equipped to render them suitable for passenger train service, either the A.A.R. Standard Type H or the Type F Interlocking Couplers may be specified.

54-Q.—In cases where wrought steel wheels removed from passenger service are fit for further service in freight cars and used therein in connection with A.A.R. 1940-design passenger car axles, how should charges and credits for such 1940-design axles be handled when in freight service?

A.—Where secondhand A.A.R. 1940-design passenger car axles, on which wheels seats exceed dimension new of A.A.R. Standard or Alternate Standard tubular type axles, are used under freight cars, charges and credits shall be as per Items 195 to 200 of Rule 101.

The same principles for charges and credits as outlined in Interpretations Nos. 5 and 6 of Rule 98 apply when one-wear or multiple-wear wrought-steel wheels are mounted on A.A.R. 1940-design passenger car axles.

55-Q.—Effective August 1, in Supplement No. 1 to the 1953 Code Interchange Rule 5 was modified to extend time limit for rendition of bills for repairs authorized by defect cars, from two years to three years; is the three year period applicable only to defect cards issued on and after August 1, 1953?

A.—The three-year time limit specified for repairing damaged cars on authority of defect car per Rule 5 and 94 as outlined in Supplement No. 1 to the 1953 Code of Interchange Rules applied only to cars repaired on and after August 1, 1953.

56-Q.—Where a gondola car equipped with A.A.R. Standard or Alternate Standard lading tie-down anchors is received in interchange with holes 1¾ inches in diameter cut out of metal side sheets, would it be proper to request defect card from the delivering line for such damage?

A.—Yes.

57-Q.—Should defective Ride Control Package Springs removed from foreign cars be treated as snubbers insofar as the requirements of Interchange Rule 17 are concerned?

A.—Ride Control Package Units come under the classification "other snubbing devices" and defective units removed should be handled as per second paragraph of answer to Interpretation (M-10) to Rule 17. Defect car for labor only should be issued for wrong repairs, as per Interpretation (M-8) to the same rule.

Where A.A.R. Standard or Recommended Practice helical springs are applied to replace defective or missing Ride Control Package Units, one of the replacements should be a unit type of spring snubber, as provided for in Rule 17, Section (p).

58-Q.—What is the present status of the Type F interlocking coupler?

A.—It is now classed as A.A.R. Alternate Standard.

59-Q.—In cases of failures of A.A.R. Alternate Standard Type F couplers, would there be any repair problem involved where such type couplers are not available for replacement purposes?

A.—No. In case of its failure or failure of any of its attachments, replacement may be made with A.A.R. Standard Type E coupler, Y-40 yoke and front follower.

60-Q.—Are there any restrictions as to the kind of wheels which may be applied to covered hopper cars of 70-ton capacity built new or rebuilt subsequent to August 1, 1954?

A.—The use of cast iron wheels in such cases is prohibited.

61-Q.—Where handling line removes a U-section truck side frame on account of cracked or broken which was cast subsequent to 1926, may same be immediately disposed of as scrap?

A.—No. Such truck side frame must be held and reported to the car owner for disposition as outlined in Interpretation No. (M-12) to Rule 17.

62-Q.—In cases where four-position release control retainer is found missing in interchange, with bracket broken and in place on car, no Rule 32 condition involved, what action may be taken by receiving line?

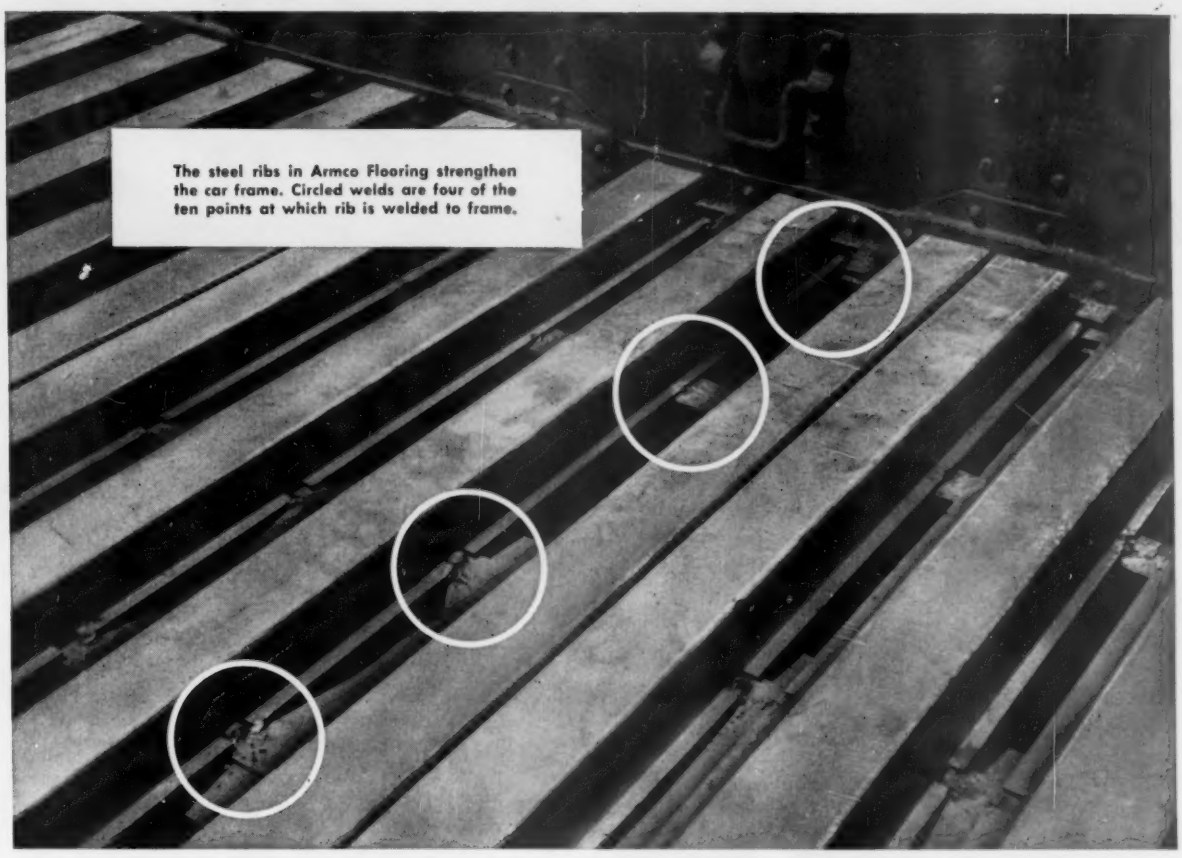
A.—Receiving line may demand from the delivering line a defect card for the missing four-position release control retainer less bracket and strainer. In such cases, renewal of the bracket and strainer would be considered as owners responsibility.

63-Q.—May charge be made against a car owner for the renewal of the service portion only of AB valve where C.O.T. & S. (Cleaned, Oiled, Tested & Stenciled) of entire brake equipment is not performed?

A.—No.

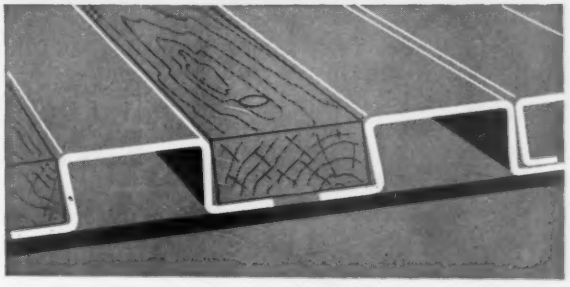
64-Q.—What rule applies when a pair of wheels is removed on account of worn flange on one wheel, owners responsibility, and after wheels are dismounted at the shop the axle is found to be bent?

A.—In addition to specifying worn flange wheel, the billing repair card should indicate that axle was bent, and the handling line should assume the cost of the bent axle as well as the labor involved and the cost of the items incidental to exchange of wheels as outlined in Rule 65.



The steel ribs in Armco Flooring strengthen the car frame. Circled welds are four of the ten points at which rib is welded to frame.

ARMCO FLOOR strengthens car frame



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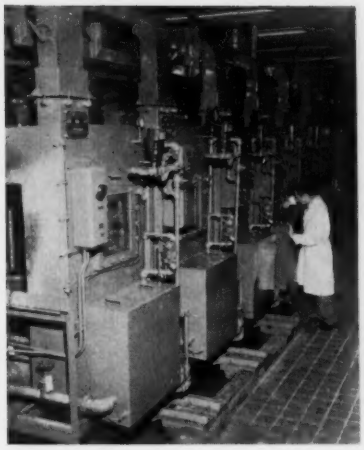
NEW DEVICES



Multi-Stage Spray Washer

For practical research projects such as various cleaning applications, including heavy-duty paint stripping of railroad cars and equipment, the Research and Development Division, Wyandotte Chemicals Corporation, Wyandotte, Mich., has installed its new multi-stage spray washer which is equipped with 7 completely independent units.

The only one of its kind in the country, its units may be disconnected, pulled out, reassembled, and the line shortened or lengthened to duplicate precisely any kind of washing cycle desired. Stages 1 and 6 are constructed of mild steel; stages 2, 3, 4, and 5 designed to handle acids, are built entirely of solid stainless steel. Stage 7, a hot air blow-off, is the drying unit. An overhead carrier passes metal parts through the washer from which they emerge passing the hot air blow-off unit.

■

Expanding Extruded Sealer

An extruded rubber base sealer with 100 per cent solids content that expands over its entire length when heat cured is a recent development of the Adhesives and Coatings Division, Minnesota Mining and Manufacturing Co., Detroit 2. Applied in the form of a flexible rubber strip, the sealer known as EC-1209, cures and expands when heated to form a gasket-like material between two surfaces. It seals out water, dust, dirt and acts like a cushion to prevent rattles.

The amount of volume increase depends on time and temperatures used in curing. A 40 min. cure at 250 deg. F. will produce a swell of 70 to 80 per cent, while a 15 min. cure at 350 deg. F. will cause the sealer to swell 125 per cent. When cured, the sealer remains flexible to about minus 20 deg. F. and provides long service at temperatures up to 150 deg. F.

The sealer can be used to seal wheel housings and truck floor panels. Normal packaging is in 30 in. lengths of ¼ in. dia. material, with each box containing about 180 ft. of sealer.

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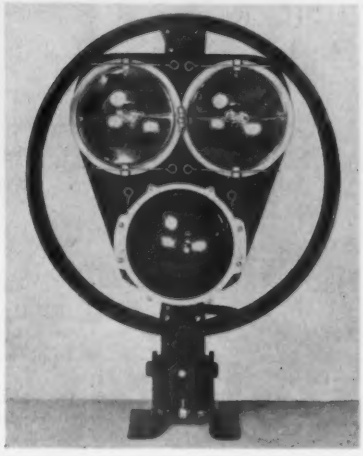


Mars Tri-Eight Light

At the request of some railroads for a locomotive signal light having a more powerful beam than is possible with a single 200-watt sealed beam headlight lamp, and which is also free of the need for reflector cleaning and maintenance, the Mars Signal Light Company has announced its Tri-Eight signal lights.

This light makes use of three 200-watt sealed beam headlight lamps, two for the white beam for highway crossing protection and one with an A.A.R. red filter for emergency flagging protection.

The beam pattern is a horizontal figure 8 which insures that the beam of light strikes highways crossing the railroad, whether the crossing is at grade, below grade or above grade.

A separate resistor and circuit is provided for each of the lamps so that in case one lamp burns out the others will still be operative.

The change from white to red, or vice versa, is made automatically by means of one relay.

■

Thread Repair Kit

Designed for use in railroading, transportation and other repair shops, this repair kit contains an assortment of 25 inserts in each of four commonly-used sizes. All tools necessary for the wire insert method of thread repair are included. Produced by the Heli-Coil Corporation, Danbury, Conn., the kit is designated No. 34CS.

Recesses are milled into the wooden case to receive the inserts and tools. The case is fitted with a hinged cover to prevent the contents from being displaced.

A printed direction sheet, glued to the inside cover, gives full instructions for installation of inserts.

■

Water Separator And Filter

This unit, the Model FEQ-5, is a combination water separator and micronic filter for diesel fuels. Manufactured by Warner Lewis Company, Tulsa 8, Okla., it is said to be small, compact, and easily installed. The device can replace, or be used in addition to an existing pressure filter.

Primarily intended to remove water and dirt immediately before the diesel fuel is injected into the cylinder, it is rated up to 250 gal. per hr. The device, designed to protect injectors from damage by water and dirt, delivers fuel 99.995 per cent water free and removes solids down to 5 microns.

Cast aluminum construction with universal brackets aid in installation directly on the fuel supply line.

■

Heavy-Duty Lift Trucks

Two new heavy duty lift truck models have been introduced by the Hyster Company, 2902 N. E. Clackamas street, Portland 8, Oregon. They are the Models XA-60 and ZA-80. Both are gasoline-engine powered and mounted on pneumatic tires with rear-wheel steering.

Designed primarily as an outside truck, the 8,000-lb. capacity ZA-80 can be op-

erated efficiently indoors as well as out. Special attention was given to operator comfort, ease of daily servicing and safety. Other outstanding features are short over-all length (117⅜ in. without forks) and long wheelbase (76 in). Standard lift height is 9 ft., with optional heights from 6 to 16 ft. Over-all width is 51¾ in., top speed 10.9 m.p.h., and inside turning radius 43½ in.

The XA-60 model is a 6,000-lb. capacity version of the ZA-80 incorporating all the features of the larger truck, but with shorter wheelbase (65 in.), width (51 in.) and over-all length (106⅜ in.). Top speed is 12.5 m.p.h. and inside turning radius is 36½ in.

Both trucks have a 12-in. dry plate clutch which can be replaced in less than an hour without removing the engine or transmission, and large heavy-duty disc-type industrial brakes. Both trucks were thoroughly tested for two years in industry under actual field conditions before release.

■

Cutter That Does Not Crush Cables

A shear type tool for cutting soft copper and aluminum cables, insulated or otherwise, in sizes up to 1⅜ in. outside diameter, has been announced by H. K. Porter, Inc., Somerville, Mass. The manufacturer states that it has the true shear action of two sharp curved passing jaws so that the cut does not flatten or crush the cable ends but still cuts cleanly. It is for soft, non-steel metals only.

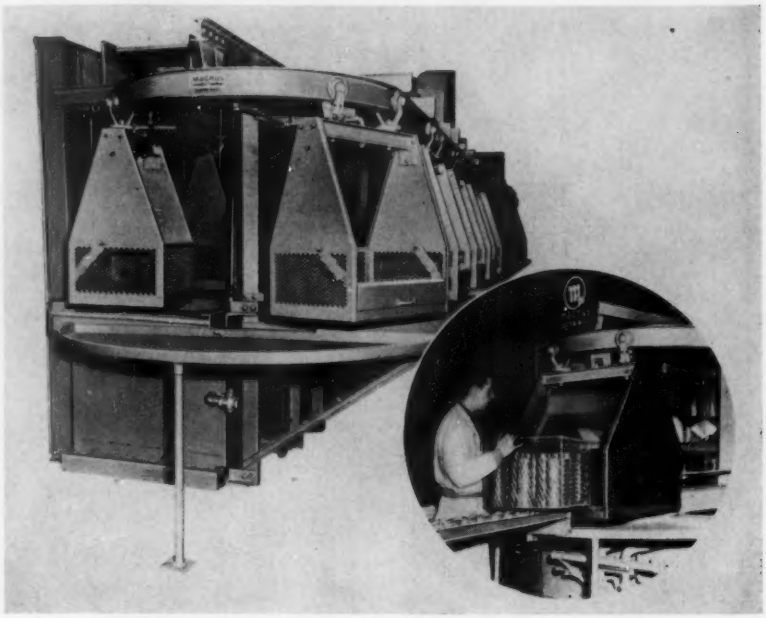
■

Silicone Leather Preservative

To keep work shoes and leather equipment soft and pliable despite deteriorating influences, the Dow Corning Corporation, Midland, Mich., has perfected a silicone leather preservative called Shoe Saver.

The compound is a clear fluid and can be applied with a soft cloth or swab. It is water repellent and not a waterproofing agent and does not seal the leather pores. The material is said to increase the resistance to abrasion and heat by as much as 50 per cent. Properly applied, the preservative lasts the life of the shoe.

It is available in 4 oz. bottles, pint cans, quart and gallon containers.

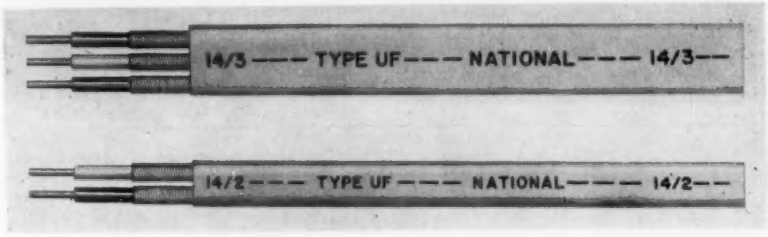


Multi-Stage Batch Cleaner

A new automation development, the AJA LIF fully automatic multi-stage batch cleaning and processing method has been pioneered by the Equipment Division, Magnus Chemical Company, Inc., Garwood, N. J. These units can be used for cleaning all types of metal parts ranging from intricate mechanisms in large batches to large hollow bodies.

The device consists of a series of independent, self-contained dipping units serviced by an automatic conveyor system. Dipping, raising and transfer of parts from one stage to another is controlled by a pre-determined time program.

The equipment can be designed for any number of stages, alkaline or acids, and drying operations. It requires only one operator and can be installed in any existing production line without a special foundation.



Underground Feeder Cable

Type UF (underground feeder) electrical cable has been introduced by the National Electric Products Corporation, Pittsburgh, Pa. Called Nepconol, the new product is said to be the most economical cable for direct burial underground. Available in single conductor in sizes 14 through 4, the standard color is black. In two-conductor, with or without ground wire, and three-conductor, it is available in sizes 14 through 10 for branch circuit and feeder services; the standard color is ivory. Installation of underground feeder circuits eliminates overhead wiring hazards.

UF cable is highly resistant to elements, in the soil, including moisture, acids and oils, which might damage electrical distribution systems. Tough thermo-plastic, used as insulation for the conductors and as a jacket for the cable also gives the cable damage-resistant characteristics. The cable is strengthened by fibre glass members which separate the conductor insulation from the cable jacket. This also aids in stripping the sheath.

Also recognized for use as Type NMC (non-metallic sheathed cable corrosive resistant), National Electric Type UF cable has been granted Underwriters' Laboratories approvals and is provided for in the 1953 National Electric Code.

The cable is recognized by the Code for branch or feeder circuits buried directly in the earth when provided with over-current protection. Multiple-conductor cables, in addition, are recognized for interior wiring either exposed or concealed in dry, wet or corrosive locations, for installation inside masonry block or tile walls, and for imbedding in plaster or shallow chase in masonry.

(*Continued on page 126*)

NEWS

Freeman Confirmed as NYO&W Trustee

THE Interstate Commerce Commission has confirmed the appointment of Lewis D. Freeman as trustee of the New York, Ontario & Western. Mr. Freeman was born at Gettysburg, Pa., July 11, 1888, and began his career as machinist apprentice with the Baldwin Locomotive Works at Philadelphia. He later served as draftsman for the Baltimore & Ohio; chief draftsman for the Kansas City Southern; shop superintendent and assistant superintendent motive power of the Seaboard; and assistant chief mechanical officer and assistant superintendent motive power of the Chesapeake & Ohio. After serving as consulting engineer at Richmond, Mr. Freeman joined the Reconstruction Finance Corporation as examiner in 1938 and became head of its Railroad Section in 1947.

W. C. Barnes Dies in Florida

W. C. BARNES, retired engineer of tests of the Association of American Railroads, died at St. Petersburg, Fla., on February 21.

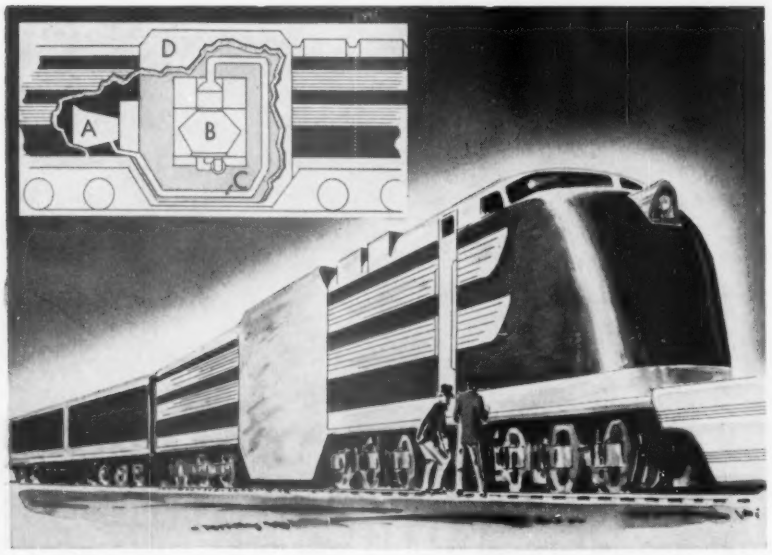
Atomic Power for Locomotives?

AN atomic locomotive, design for which has been developed by a University of Utah nuclear physicist, would have the power of at least four diesel units and the pickup of an electric locomotive, according to a statement by the university. The atomic-locomotive project was supervised by Lyle J. Borst, professor of physics at the school.

"While a locomotive could be built to operate a year without refueling," Dr. Borst said, "the present design calls for addition of a pound of uranium every few months. Analysis of the cost of operating such a locomotive requires information on the price of uranium, which is now a secret. However, basing our estimates on published figures, the proposed locomotive will compete successfully with diesel power under favorable circumstances."

SMALL REACTOR—Steam for the locomotive, the university's statement said, would be obtained from a small atomic reactor two feet wide, three feet high and three feet long, which "would produce as much steam as the largest steam locomotive." Electricity generated by a turbine would turn the wheels.

The locomotive would consist of two 80-foot sections. The first, having 24 wheels, would support the reactor. The second section would carry radiators equal to more than 1,000 automobile radiators, to get rid of reactor-produced heat. Weight of the proposed locomotive "would be comparable to that of present-day locomotives."



PROPOSED ATOMIC-POWERED LOCOMOTIVE would resemble conventional locomotives except for 200-ton steel container in center, to contain nuclear reactor. Cutaway section shows Reactor (B) which heats water and sends steam through pipe (C) to turbine (A). Steel container (D) has four-foot-thick walls to protect crew from radiation.

ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE MARCH ISSUE

DIESEL-ELECTRIC LOCOMOTIVE ORDERS

Road	No. of units	Horsepower	Service	Builder
Durham & Southern	3[1]	1,200	Freight	Baldwin-Lima-Hamilton
Georgia	3[2]	1,750	Road switch	Electro-Motive
Monongahela	10[3]	1,200	Switch	Baldwin-Lima-Hamilton
New York Central System	4[4]	1,750	Road switch	Electro-Motive
	3[4]	900	Switch	Electro-Motive
Piedmont & Northern	6[5]	1,600	Switch	American Locomotive
Western of Alabama	2[5]	1,750	Road switch	Electro-Motive

FREIGHT-CAR ORDERS

Road	No. of cars	Type of car	Builder
Burlington Refrigerator Express	200[6]	50-ton refrigerator	Pacific Car & Fdry.
Chicago Great Western	2[7]	70-ton tank	American Car & Fdry.
Northern Pacific	50[8]	70-ton refrigerator	Pacific Car & Fdry.
Union Refrigerator Transit Lines	800[9]	40-ton refrigerator	General American
Western Fruit Express	250[6]	50-ton refrigerator	Pacific Car & Fdry.
Western Pacific	100[10]	50-ton box	Pullman-Standard

PASSENGER-CAR ORDERS

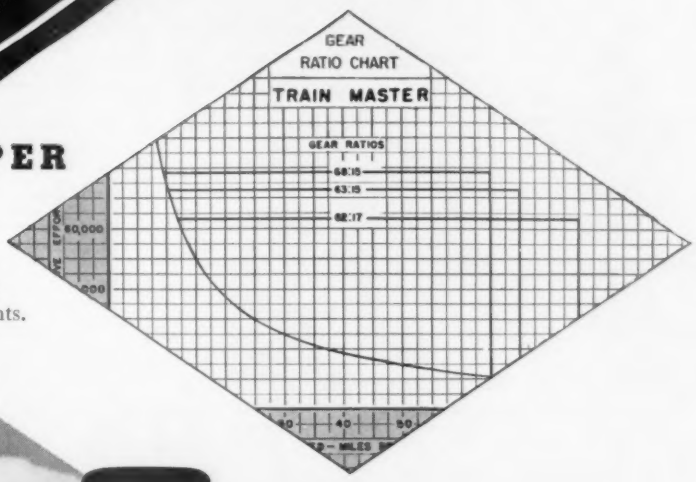
Road	No. of cars	Type of car	Builder
Canadian Pacific	1[11]	RDC-1	Budd
Northern Pacific	1[12]	RDC-3	Budd
Southern Pacific	1[13]	RDC-1	Budd

[1] Ordered late in 1954. Upon delivery, road will be completely dieselized.
[2] Estimated unit cost, $159,634. Delivery scheduled for May.
[3] Estimated cost, $1,084,000. Deliveries begun in March and to be continued in June and July.
[4] Deliveries expected to be completed this month. For assignment to Cleveland Union Terminal.
[5] Estimated cost, $319,286. Delivery expected in May.
[6] Originally ordered from company shops.
[7] Estimated cost, $26,000. Delivery expected in June.
[8] Estimated cost, $23,012 each. Delivery scheduled for third quarter of 1954.
[9] Delivery expected to begin during late part of second quarter of this year.
[10] To cost in excess of $800,000. Delivery expected this month.
[11] For delivery this month.
[12] Estimated base cost of the rail diesel car $162,350. Delivery expected during first quarter of 1955. Estimated cost of business cars, $330,000 each. Delivery scheduled for December.
[13] To cost in excess of $150,000. Delivery expected this month.

NOTE:
Erie.—The board of directors has authorized purchase of 100 specially equipped roller-bearing flat cars "with an eye toward possible future use in piggyback trailer service." It is estimated the cars will cost over $1,000,000. Specifications will call for a 75-ft. car, 9½ ft. wide, with a capacity of at least 60 tons, equipped with four-wheel, roller-bearing trucks for use in high-speed service. Rubber-cushioned draft gears will be used with tight-lock couplers.

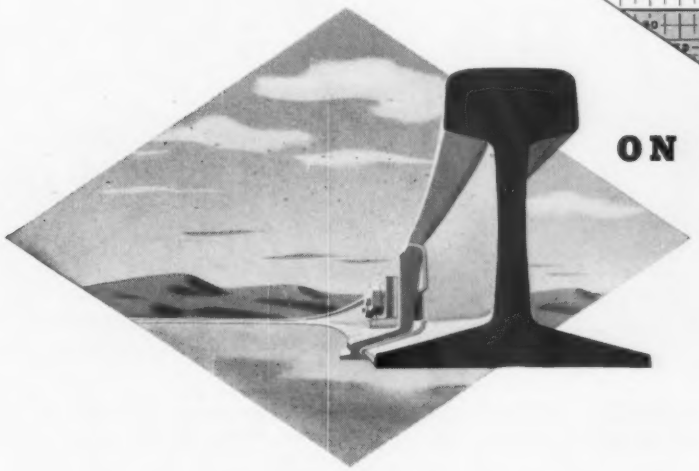
ON THE

Reading Lines



ON PAPER

Train Master design promised the combination of power and versatility sought by the Reading—and they placed their first Train Master order from blueprints.



ON THE RAILS

Train Master performance delivered beyond expectations—and the Reading more than doubled its original TM order to a total of 20,000 horsepower.

Your Best Motive Power Investment

is in **TRAIN MASTER**

Fairbanks, Morse & Co.
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FAIRBANKS-MORSE

a name worth remembering when you want the best

DIESEL LOCOMOTIVES AND ENGINES · RAIL CARS AND RAILROAD EQUIPMENT · ELECTRICAL MACHINERY · PUMPS · SCALES · WATER SERVICE EQUIPMENT · HAMMER MILLS · MAGNETOS

Locomotive Rebuilding Plant

A complete locomotive rebuilding and overhaul service has been established at Erie, Pa., by the General Electric Company's Locomotive and Car Equipment Department. This facility will be in addition to the service shops for motors, generators and other electrical equipment, currently available to users of locomotives throughout the United States. General Electric maintains a network of 31 such service shops.

The new service is being set up to fill a need for a complete locomotive rebuilding for industrial locomotive users and those railroads operating comparatively small fleets of motive power.

It will include all kinds of heavy maintenance and overhaul rebuilding, modernization, conversion, and wreck rebuild work.

New locomotive warranties will be issued to operators of locomotives that are completely rebuilt. On locomotives, rebuilt or overhauled to customers' specifications, warranties will be issued to cover areas on which work was done.

British Approach to the Pulverized-Coal Gas Turbine

Preliminary details of a coal-burning gas-turbine locomotive, which is being designed and built jointly by the North British Locomotive Company, Ltd., Glasgow, and C. A. Parsons & Co., Ltd., New-Castle-on-Tyne, England, have been disclosed by the former company. In this locomotive, which is intended for test on the British Railways, the problem of protecting turbine blades from the action of flyash has been eliminated by driving the turbine with air heated through a tubular heat exchanger known as an "exhaust heater" through which pass the gases from the combustion chamber. The air under pressure moves through the exhaust heater where its temperature is raised to nearly 1,300 deg. F. Thence it drives the compressor turbine and the power turbine in that order, after which it passes to the combustion chamber into which the pulverized coal is fed. The power turbine is said to be geared directly to the driving wheels.

Miscellaneous Publications

DIESEL LOCOMOTIVE AND SHOP SURVEYS —Railway Locomotives and Cars, 30 Church Street, New York 7.

1954 Survey of Diesel-Electric Units in Railway Service. A four-page inventory of all diesel units in service on 154 roads in the United States and Canada, classified by horsepower ratings.

New 1953 Installations of Diesel-Electric Locomotives. An analysis, with details, by railways, of the number of units, month installed, type, horsepower, and name of builder. Covers 2,337 units installed by 78 roads in the United States and Canada.

Survey of Repair Shops for Diesel-Electric Locomotives. A 12-page list of 445 shops on 141 roads, showing location and type of repair facilities for mechanical and electric work, running and heavy repairs, wheel work, armature winding and engine overhaul.

Prices: Single copies $1 each; any 6 for $5; any 12 for $10; any 25 for $20; 50 or more, 50 cents each.

SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

FREIGHT SERVICE (DATA FROM I.C.C. M-211 AND M-240)

Item No.		Month of November 1953	Month of November 1952	11 months ended with November 1953	11 months ended with November 1952
3	Road locomotive miles (000) (M-211):				
3-05	Total, steam	10,040	16,359	134,206	188,694
3-06	Total, Diesel-electric	31,329	29,148	343,881	301,390
3-07	Total, electric	670	747	7,975	8,317
3-04	Total, locomotive-miles	42,118	46,297	486,820	498,773
4	Car-miles (000,000) (M-211):				
4-03	Loaded, total	1,559	1,733	18,317	18,229
4-06	Empty, total	943	922	10,120	9,836
6	Gross ton-miles-cars, contents and cabooses (000,000) (M-211):				
6-01	Total in coal-burning steam locomotive trains	18,567	29,053	244,243	332,560
6-02	Total in oil-burning steam locomotive trains	4,655	8,521	64,945	92,730
6-03	Total in Diesel-electric locomotive trains	86,154	82,663	961,340	839,427
6-04	Total in electric locomotive trains	1,925	2,101	22,632	23,032
6-06	Total in all trains	111,561	122,482	1,295,668	1,289,067
10	Averages per train-mile (excluding light trains) (M-211):				
10-01	Locomotive-miles (principal and helper)	1.03	1.04	1.03	1.03
10-02	Loaded freight car-miles	39.90	41.00	40.80	40.00
10-03	Empty freight car-miles	24.10	21.80	22.50	21.60
10-04	Total freight car-miles (excluding caboose)	64.00	62.80	63.30	61.60
10-05	Gross ton-miles (excluding locomotive and tender)	2,855	2,898	2,884	2,830
10-06	Net ton-miles	1,274	1,348	1,311	1,304
12	Net ton-miles per loaded car-mile (M-211)	31.90	32.90	32.20	32.60
13	Car-mile ratios (M-211):				
13-03	Per cent loaded of total freight car-miles	62.30	65.30	64.40	65.00
14	Averages per train hour (M-211):				
14-01	Train miles	18.60	17.80	18.20	17.60
14-02	Gross ton-miles (excluding locomotive and tender)	52,506	51,054	51,829	49,129
14	Car-miles per freight car day (M-240):				
14-01	Serviceable	44.70	47.40	45.80	45.10
14-02	All	42.60	45.20	43.60	42.90
15	Average net ton-miles per freight car-day (M-240)	847	969	903	907
17	Per cent of home cars of total freight cars on the line (M-240)	48.90	40.80	46.30	43.20

PASSENGER SERVICE (DATA FROM I. C. C. M-213)

3	Road motive-power miles (000):				
3-05	Steam	2,864	5,287	45,285	73,338
3-06	Diesel-electric	20,065	18,915	221,886	205,094
3-07	Electric	1,428	1,530	16,707	17,718
3-04	Total	24,358	25,732	283,878	296,156
4	Passenger-train car-miles (000):				
4-08	Total in all locomotive-propelled trains	243,684	257,745	2,864,316	2,955,824
4-09	Total in coal-burning steam locomotive trains	14,708	28,794	250,712	380,561
4-10	Total in oil-burning steam locomotive trains	10,238	19,216	157,659	270,083
4-11	Total in Diesel-electric locomotive trains	202,727	192,454	2,270,366	2,108,414
12	Total car-miles per train-miles	9.63	9.72	9.76	9.75

YARD SERVICE (DATA FROM I.C.C. M-215)

1	Freight yard switching locomotive-hours (000):				
1-01	Steam, coal-burning	482	738	6,461	8,794
1-02	Steam, oil-burning	70	154	1,139	1,820
1-03	Diesel-electric[1]	3,384	3,352	37,889	34,876
1-06	Total	3,953	4,265	45,703	45,747
2	Passenger yard switching hours (000):				
2-01	Steam, coal-burning	17	23	218	298
2-02	Steam-oil-burning	5	8	70	115
2-03	Diesel-electric[1]	253	253	2,813	2,808
2-06	Total	303	316	3,451	3,585
3	Hours per yard locomotive-day:				
3-01	Steam	6.20	7.30	6.80	7.00
3-02	Diesel-electric	15.80	16.60	16.20	16.20
3-05	Serviceable	14.60	14.80	14.90	14.40
3-06	All locomotives (serviceable, unserviceable and stored)	13.00	13.10	13.20	12.50
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.76	1.70	1.73	1.74
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	0.77	0.76	0.75	0.75

[1]Excludes B and trailing A units.

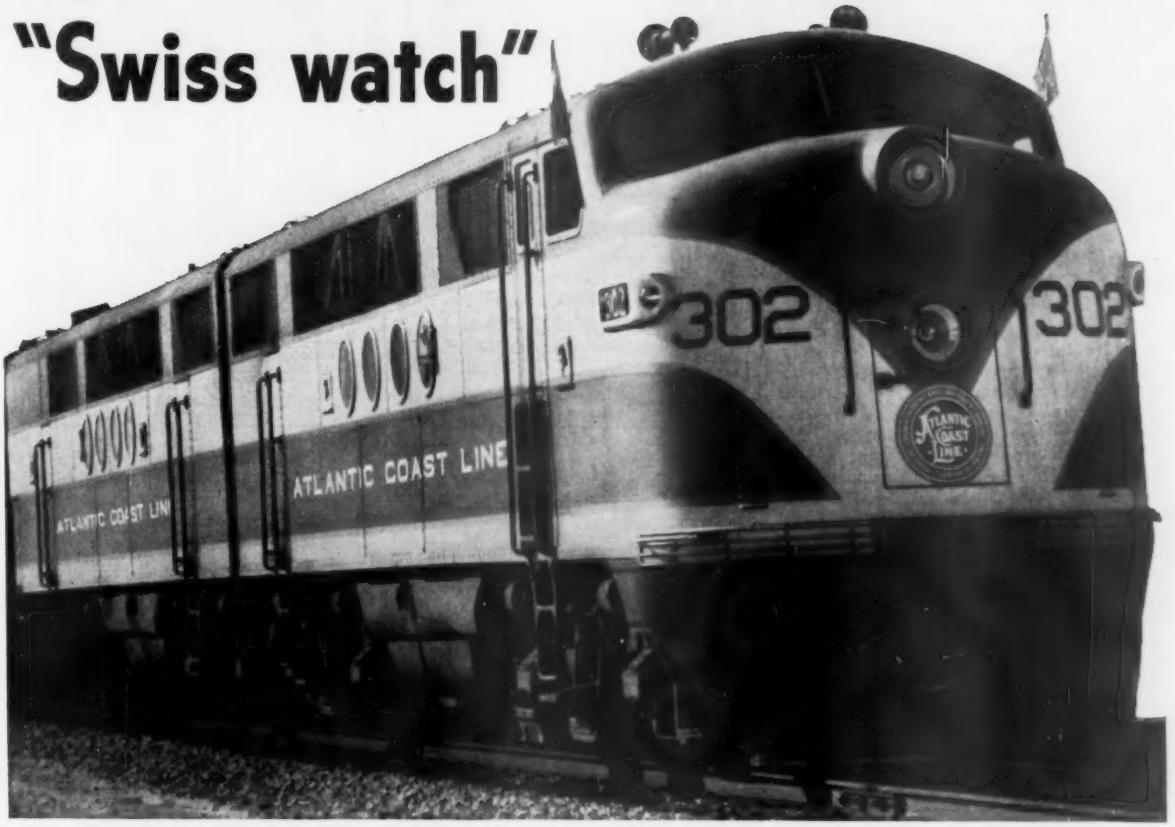
SUPPLY TRADE NOTES

LANDIS TOOL COMPANY.—*William T. Martin,* formerly manager of the Indianapolis office, has been transferred to Waynesboro, Pa. *John Mourer* has been appointed manager of the Indianapolis office. Ht was formerly head of the Pittsburgh office. *Eckley Schatzman* will take charge of the Hartford direct office, succeeding *John Schobinger,* resigned.

AMERICAN CAR & FOUNDRY CO.—*Norman E. Carlson* has been appointed works manager in charge of all operations of the St. Charles, Mo., plant, succeeding *Roy D. Jablonsky,* who has resigned.

Mr. Carlson received the degree of Bachelor of Mechanical Engineering from the University of Minnesota in 1933. From then until 1943 he was consecutively with Swift & Company and the Grey Van Lines. He then became assistant master carbuilder in the Mechanical Department of the Great Northern. He became associated with ACF in December 1951 as assistant chief mechanical engineer. Mr. Carlson served for three years as vice-president and one year as president of the Northwest Carmen's Association.

300 TON "Swiss watch"



Although massive and tremendously powerful, the diesel locomotive is a finely tooled, precision-built machine. That's why there is a wide variety of Esso Railroad Lubricants, each prepared to service a particular group of working parts, and each tailor-made to assure peak efficiency.

Like Esso Railroad Lubricants, Esso Diesel Fuel is a product carefully developed and laboratory-tested for diesel locomotives... it has proved itself by top performance through millions of miles in actual use.

For high-quality, dependable fuels and lubricants, specify Esso Railroad Products.

Like *All* Esso Railroad Products These Assure You Dependable Performance

Diesel Fuels
ESSO ANDOK Lubricants—versatile greases
ARACAR—journal box oils
ARAPEN—brake cylinder lubricant
ESSO XP Compound—hypoid gear lubricant
DIOL RD—Diesel lube oil
COBLAX—traction motor gear lube
VARSOL—Stoddard Solvent
SOLVESSO—Aromatic solvent
ESSO Weed Killer
ESSO Hot Box Compound
AROX—pneumatic tool lube
CYLESSO—valve oil
ESSO Journal box compound
Asphalt
Cutting Oils
Rail Joint Compounds
Maintenance of Way Products
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ESSO STANDARD OIL COMPANY
Boston, Mass.—New York, N. Y.—Elizabeth, N. J.— Philadelphia, Pa.— Baltimore, Md.—Richmond, Va.—Charlotte, N. C.—Columbia, S. C. — Memphis, Tenn. — New Orleans, La.

ELECTRO-MOTIVE DIVISION, GENERAL MOTORS CORPORATION — *Walter J. Eichman*, district sales representative, has been appointed district sales manager of the western district of the Chicago region. *Raymond H. Bish* has been appointed to the newly created position of manufacturing services and facilities. *George D. Baker* has been named manufacturing manager for Plant One at LaGrange—engine, transmission and locomotive divisions. *David R. Kendell*, manufacturing manager of factory branches, has been appointed manufacturing manager, rebuild — locomotive components. *Marvin Anderson* has been named parts sales manager, and *Fenton D. Lapham*, parts supply manager.

Additions which have trebled the size of the Electro-Motive Division of General Motors factory branch at Jacksonville, Fla., were formally opened on March 18. The plant, at which major components of diesel locomotives are rebuilt for railroads throughout the southeastern section of the United States, has been increased from 26,880 sq ft to 77,568 sq ft, including an office building for the E-M regional sales and service headquarters in that territory.

N. C. Dezendorf, vice-president of General Motors and general manager of Electro-Motive Division, in his address at the formal opening appraised the establishment of this and other similar Electro-Motive plants as pointing the way to further railway economies in maintenance. "The very nature of the design of the diesel locomotive," he said, "makes it possible for railroads to take a big new bite out of costs, on top of the great savings in operating expense already realized. We have designed the diesel locomotive with a high degree of standardization, which means interchangeability of parts and assemblies. If it were geographically feasible, one stock of replacement parts could take care of all of the more than 15,000 GM diesel locomotives operating on more than 150 U.S. railroads from coast to coast. It is, of course, advisable that parts be closer to the locomotives in service, but we still find it possible to cover the entire fleet in the United States with eight strategically located centers."

The same principle, he said, holds true in the rebuilding of worn major components (engines, generators, traction motors) and in rebuilding or modernizing the whole locomotive. "No longer is it necessary for each railroad to have its own separate costly set-up of buildings and machinery to perform their operations, which occur at long periods, as much as every tenth or twelfth year in the case of locomotives in certain classes of service. E-M factory branches like that formally opened here today are set up to handle this work at six strategic centers.

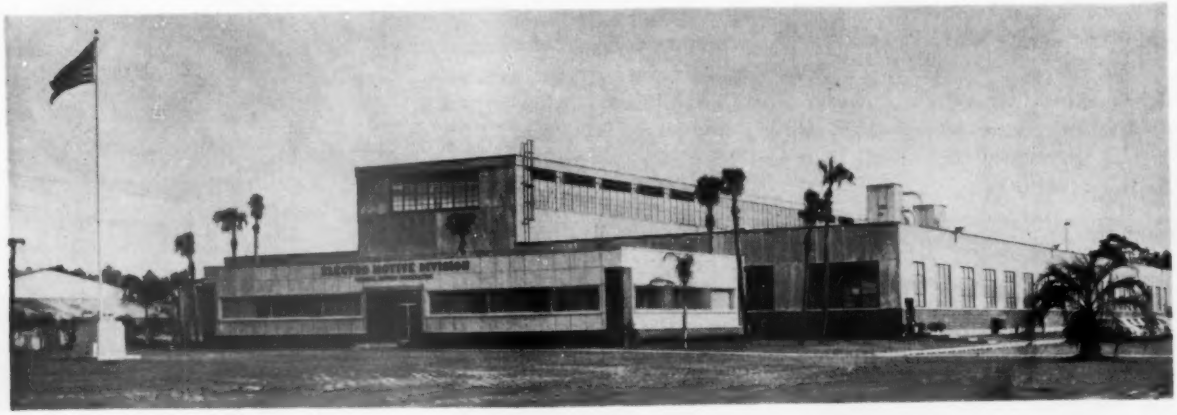
"Not only do railroads escape the financial burden of building up and carrying in their capital structures a facility like this Jacksonville plant," said Mr. Dezendorf, "but they also get the advantage of the lower cost of doing work that goes with mass production methods and machinery, made possible by the fact that the requirements of a large number of railroads are pooled in a place like this. They get the advantage of the latest developments of machines and methods from the parent factory, where study to reduce manufacturing cost is an incessant activity of a large, widely experienced staff. They get the quality that goes with inspection and test methods and devices, developed by the manufacturer to insure quality in original manufacture. Incidentally, the Jacksonville plant, and all others like it in the Electro-Motive chain, give the same warranty on a rebuild job that the parent plant does on the same item brand new."

Mr. Dezendorf cited Interstate Commerce Commission reports as showing that

(*Continued on page 110*)

SUMMARY OF MONTHLY HOT BOX REPORTS

	Foreign and system freight car mileage (total)	Cars set off between division terminals account hot boxes			Miles per hot box car set off between division terminals
		System	Foreign	Total	
July, 1950	2,745,932,894	.....	.....	23,957	114,619
August, 1950	2,937,455,020	7,422	15,490	22,912	128,206
September, 1950	2,974,297,739	6,541	12,881	19,422	153,141
October, 1950	3,165,997,915	4,343	8,935	13,278	238,439
November, 1950	2,868,871,913	2,536	5,331	7,867	364,672
December, 1950	2,813,042,212	2,278	5,968	8,246	341,140
January, 1951	2,840,847,511	2,870	8,436	11,306	251,269
February, 1951	2,425,226,454	4,528	14,063	18,591	130,452
March, 1951	3,063,173,942	3,667	10,078	13,745	222,857
April, 1951	2,996,562,763	3,702	8,914	12,616	237,521
May, 1951	3,013,634,782	5,631	13,737	19,368	155,599
June, 1951	2,874,873,495	7,074	15,376	22,450	128,057
July, 1951	2,768,920,095	8,886	18,823	27,709	99,929
August, 1951	3,009,371,111	9,023	19,092	28,115	107,038
September, 1951	2,925,570,545	6,472	13,565	20,037	146,008
October, 1951	3,116,490,095	4,131	9,053	13,184	236,384
November, 1951	2,939,503,144	2,022	4,405	6,427	457,368
December, 1951	2,752,316,133	2,130	5,398	7,528	365,611
January, 1952	2,824,298,630	3,208	7,197	10,405	271,437
February, 1952	2,809,162,671	2,723	6,473	9,196	305,477
March, 1952	2,943,812,727	2,594	5,877	8,471	347,517
April, 1952	2,766,313,714	3,826	7,759	11,585	238,784
May, 1952	2,918,508,445	6,020	10,938	16,958	172,102
June, 1952	2,672,512,889	8,466	14,495	22,961	116,394
July, 1952	2,575,298,912	10,566	15,833	26,399	97,553
August, 1952	2,924,917,122	11,658	17,535	29,193	100,192
September, 1952	2,931,129,734	7,536	13,608	21,144	138,627
October, 1952	3,093,990,289	4,058	8,053	12,111	255,469
November, 1952	2,984,101,808	2,198	4,501	6,699	445,455
December, 1952	2,869,928,617	1,742	3,632	5,374	534,040
January, 1953	2,828,906,282	2,219	4,123	6,342	446,059
February, 1953	2,625,563,462	2,111	4,059	6,170	425,537
March, 1953	2,904,227,804	2,696	6,077	8,769	331,192
April, 1953	2,850,752,648	3,383	6,435	9,818	290,359
May, 1953	3,013,610,843	5,892	11,433	17,325	173,945
June, 1953	2,926,001,360	8,537	15,296	23,833	122,771
July, 1953	2,925,317,024	9,342	15,775	25,117	116,467
August, 1953	2,971,020,484	8,638	14,160	22,798	130,319
September, 1953	2,822,222,832	6,083	10,195	16,278	173,376
October, 1953	3,042,558,922	3,863	6,493	10,356	293,796
November, 1953	2,788,773,285	1,987	3,404	5,391	517,301
December, 1953	2,656,063,018	1,581	2,550	4,131	642,958



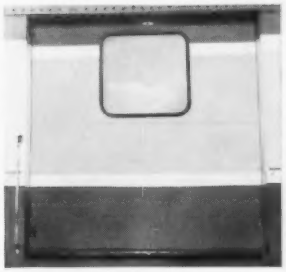
Enlarged factory branch of Electro-Motive Division of General Motors at Jacksonville, Fla.

MET-L-WOOD
METAL BONDED TO PLYWOOD

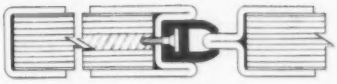
DOORS

★ LIGHT... TOUGH... DURABLE
★ NO THROUGH-BOLTS
NO WARPING
★ NO TWISTING
NO SWELLING

BAGGAGE AND POSTAL CAR DOORS



Completely weatherproof Met-L-Wood doors effectively prevent internal rust and rot... and their tough, smooth surfaces stay new-looking for years. Stainless steel channels along bottom edges of sliding doors are rustproof... virtually wearproof. All-rubber window sash installed or removed in minutes... rattle-proof... water- and weatherproof. Available in full width and split types ... sizes to meet all needs.



Exclusive Split Door Seal

Drawing above shows simple Met-L-Wood Split Door Seal which assures weather- and watertightness for years of continual use. Seal also provides effective cushion when closing split doors.

PASSENGER CAR END, VESTIBULE, INTERIOR DOORS

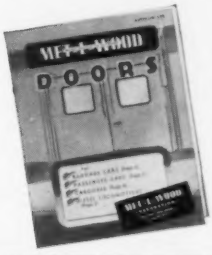
Sound-deadening, insulating, vibration-damping Met-L-Wood doors for passenger cars add to service life, cut deadweight ... Combine modern, clean-line beauty with great strength and durability. Furnished for manual or automatic operation, with or without hardware assembly. Tapping plates for hardware are built into doors ... invisible additions to strength and trouble-free service life. Sizes and types to fit all requirements ... exact dimensions insure quick assembly and perfect fit. Door thicknesses from ½" up, as required.

CABOOSE DOORS

Met-L-Wood caboose doors are built to last the life of the caboose—and to give trouble-free service the whole time. Weather-proof, warp-proof, rot-proof doors can be provided with or without stationary windows in all-rubber sash or with standard drop sash. Available with or without hardware. In all sizes to exactly meet specifications.

DIESEL LOCOMOTIVE DOORS

Widely used by builders on new locomotives, Met-L-Wood doors guarantee trouble-free operation of end and interior doors on diesel road locomotives and cab doors for diesel switchers. Furnished to exact dimensions, with or without windows; either with hardware installed, or with tapping plates placed for hardware assembly on the job.



Write for this Bulletin

Met-L-Wood Bulletin 520 gives the complete, illustrated story on Met-L-Wood doors for railroad uses ... shows construction details, describes standard and special types and sizes. Your copy sent free upon request—write for it today.

MET-L-WOOD
CORPORATION

6755 W. 65th Street
Chicago 38, Illinois

MET-L-WOOD • *STRONG... LIGHT... Smooth Finish... Sound Deadening... Fire-Resisting... Insulating*

HOW TO LOSE MONEY 3 ways

1. USE OLD CARS! Maintenance costs will eat heavily into your profit picture. And a car out for repairs never makes back the money it loses!

2. REPAIR THEM OFTEN! When a car is rolling, it's making money. When it's standing still, it's losing money! There's no in between!

3. DON'T BUY NEW CARS!

New cars could be paying for themselves moving today's "turned down" freight. Avoid this extra profit!

and... ONE SURE WAY TO MAKE IT

Let an experienced a.C.f. freight car specialist show you how mass produced, standardized design freight cars lower initial costs, cut maintenance to a bare minimum, and continue to roll long after ordinary cars have passed by the wayside. It's a story well worth listening to! American Car and Foundry Company, New York
Chicago • Cleveland • San Francisco
Philadelphia • St. Louis • Washington

a.C.f.

CAR BUILDERS TO AMERICA'S RAILROADS

Shippers' Advisory Boards Point Out the Need for More Modern Cars

From north to south, east to west, inadequate flooring in freight cars is a recurring topic at Shippers' Advisory Board Meetings. The following excerpts are typical:

Several reports were made that the condition of many boxcars placed for loading was very unsatisfactory . . . there were *holes in the floors* and so forth. This requires repair work before the shipper can use the car. In some instances where cars of this type were rejected, there were no others available for loading.

Midwest 10/22/53

"Our attention was also called to the furnishing of poor class cars, *particularly with unsatisfactory floors* . . ."

Pacific Northwest 9/18/53

"The condition of box cars is generally due to *bad conditions of floors* and at the doors."

Southeast 9/18/53

"We have had many reports of *bad floors*, walls and ends . . ."

Allegheny Regional 9/17/53

". . . they must take steps toward a long-range program of improving equipment . . . just as steam locomotives have been retired and replaced with Diesels, it certainly is possible to so replace out-dated equipment as it retires, with the best of the new, and do so at the normal rate of retirements and replacement."

Pacific Coast 3/12/53

Modern Cars Call for N-S-F

N-S-F, NAILABLE STEEL FLOORING, by eliminating floor failures helps keep more Class A cars available to shippers. N-S-F does away with costly downtime, affords maximum blocking security, and adds strength at critical points of the car structure. Quickly installed in boxcars, flatcars, and gondolas, this modern flooring lasts for the life of the car. More and more railroads are finding that NAILABLE STEEL FLOORING is well worth its somewhat higher initial investment, soon pays for itself, and goes on earning.

Some of the 625 Chicago and North Western freight cars equipped with NAILABLE STEEL FLOORING. They pave the way for better freight handling with safety, security and availability.

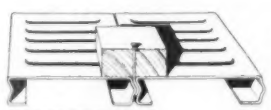
Chicago and North Western's N-S-F car No. 1, on display recently in the North Western station in Chicago. The NAILABLE STEEL FLOORING has an anti-skid finish coating of wood colored composition; a steel grain strip provides positive closure for fine bulk freight and overcomes the problem of vermin infestation.

625 new cars with NAILABLE STEEL FLOORING help CNW meet shippers' requirements

How to maintain freight car floors to the satisfaction of shippers—and keep costs down too—is a problem that is common to every railroad.

By installing NAILABLE STEEL FLOORING in 625 new freight cars, the progressive management of the Chicago and North Western took positive action to combat this problem—to the satisfaction of all concerned.

COMPLETE engineering and cost data available from Great Lakes Steel Corporation, Steel Floor Division, Ecorse, Detroit 29, Michigan. Sales representatives in Chicago, Philadelphia, St. Louis, Atlanta, Omaha, Denver, San Francisco, Montreal and New York.



PATENTS PENDING

N-S-F is made of low alloy N-A-X HIGH-TENSILE steel—remarkably strong, corrosion resistant—formed into channels, and welded together to form a unique nailing groove. Nail is clinched in a tight grip of steel, yet can be readily removed.

GREAT LAKES STEEL CORPORATION
STEEL FLOOR DIVISION ECORSE, DETROIT 29, MICH.
NATIONAL STEEL CORPORATION

54-SF-4A

ELECTRICAL INSULATION IS OUR SPECIALTY

Q. *What ONE wire and cable producer grows its own natural rubber, and makes its own synthetic rubber?*

A. UNITED STATES RUBBER COMPANY.

Q. *What ONE wire and cable producer makes plastics?*

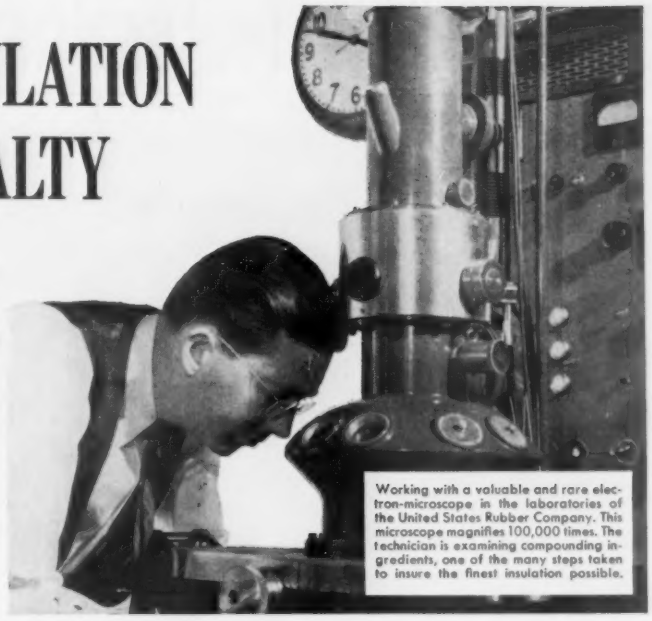
A. "U. S."

Q. *What is the most important part of wire and cable?*

A. The insulation.

Q. *Who is best equipped to make wire and cable with superior insulation?*

A. U. S. RUBBER—which grows its own natural rubber, makes its own synthetic rubber, manufactures its own plastics.



Working with a valuable and rare electron-microscope in the laboratories of the United States Rubber Company. This microscope magnifies 100,000 times. The technician is examining compounding ingredients, one of the many steps taken to insure the finest insulation possible.

Isn't it logical that a rubber company should make the best wire and cable insulation there is? U. S. Rubber has been a pioneer in insulation for over 70 years—has amassed in that time a stockpile of research data and experience that can't be beat. Electrical insulation is a "U. S." specialty!

Electrical insulation makes the difference between superior and ordinary wire and cable. Conductors of all manufacturers are standard, but insulation must be the best that science can produce. That's why your best bet in wire and cable is U. S. Rubber.

SOME MORE OF THE MANY DIFFERENT VARIETIES OF "U. S." WIRE AND CABLE

RAILROADS: Power Cables • Communications • Railway Signal • Royal Cords • Welding Cable • Railway Utility • Sup. Control • Weatherproof

UTILITIES: Power Cables • Street Lighting • Royal Cords • Network Cables • Utility Control • Pole & Bracket Cable • Service Entrance • Weatherproof • Zip Cord Pole Fixture Cable • Sup. Control

HEAVY INDUSTRY: Power Cable • Royal Cords • Welding Cables • Control Cables • Machine Tool Wire • Building Wire • Switchboard Wire • Thermostat Cable • Bus Drop Cable

ONE OF MANY SUPERIOR "U. S." WIRE AND CABLE PRODUCTS

USKORONA-NEOPRENE POWER CABLES

Ozone-resistant for high-voltage applications in wet or dry locations.

"U. S." USKORONA-NEOPRENE POWER CABLES offer to the exacting railway industry an unbeatable reliability on overhead and underground high-voltage power applications on circuits up to 8000 volts between phases and at conductor temperatures up to 75 C. They will not crack after 3 hours in air containing .015 per cent ozone. Light in weight, easy to install and join, resistant to oil, heat, sunlight, flame, acids, alkalis and corrosive chemicals. USKORONA-NEOPRENE cables also eliminate electrolysis. The following are guaranteed test values:

PHYSICAL AND AGING PROPERTIES (MINIMUM VALUES)

	Uskorona			Neoprene Jacket	
	Unaged	After 96 Hrs. O.B.	After 7 Day Geer Oven	Unaged	After 96 Hrs. O.B.
Tensile Lbs./Sq. In.	500	450	450	1800	1600
Elongation Per Cent	250	200	200	300	250

MOISTURE RESISTANCE (MAXIMUM VALUES)

Dielectric Constant and Power Factor of the insulation after immersion in water at 50 C.: Dielectric Constant, one day is 4.5; per cent gain, 1 to 14 days is 5.0; per cent gain, 7 to 14 days is 2.0; Power Factor, per cent, one day is 3.0; Stability Factor 40-80 volts/mil two weeks, per cent is .5.

U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

ELECTRICAL WIRE & CABLE DEPT. • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

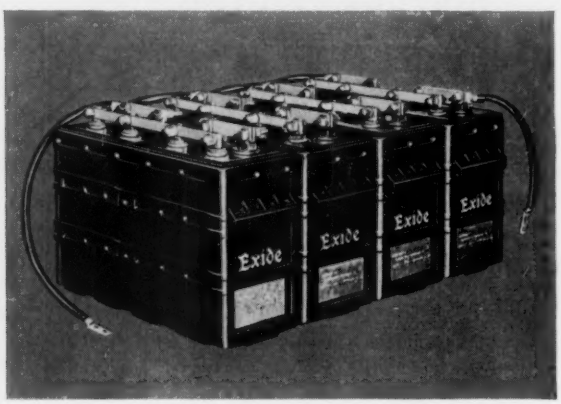
KEEP MORE PASSENGERS COMFORTABLE

. . . with bright, steady lights and cool cars!

Built by The Budd Company, this new Santa Fe coach on the El Capitan provides maximum travel comfort, with adjustable head and leg rests, fluorescent lighting, air conditioning, clean styling.

COMFORTABLE passengers are satisfied customers. Exide-Ironclad batteries insure ample power for bright, steady lights and comfortable cars even during long stops. Built to withstand hard, continuous service, they give you worry-free performance, maintain high, uniform voltage under all operating loads. Lower costs for operation, maintenance and depreciation make Exide-Ironclad batteries your best power buy—AT ANY PRICE!

THE POSITIVE PLATES are the heart of any battery. Only Exide uses a slotted tube construction. By use of tubes, more active material is exposed to the electrolyte, providing *greater power*. Also, more active material is retained, giving *longer working life*.



IMPROVED Exide-Ironclads now have power tubes made from *non-oxidizing* plastic for longest battery life, more capacity in the same space. For full details, call your Exide sales engineer—write for Form 5010 (Installation and Maintenance of Car Lighting and Air Conditioning Batteries).

Your best power buy
. . . AT ANY PRICE!

Exide®
IRONCLAD® BATTERIES

Exide **INDUSTRIAL DIVISION**, The Electric Storage Battery Company, Philadelphia 2, Pa. • *Exide Batteries of Canada, Limited, Toronto*

RUST-OLEUM keeps 'em looking like this!

There is only one Rust-Oleum . . . an exclusive formula proved throughout railroading for over 25 years. Accept no substitutes.

RUST-OLEUM®

STOPS RUST!

Protect *new* metal surfaces . . . save even *badly rusted metal!*—and cut maintenance costs, too. Simply scrape and wirebrush to remove rust scale and loose particles . . . then brush Rust-Oleum 769 Damp-Proof Red Primer directly over the *sound rusted surface*. Sandblasting, chemical pre-cleaning and other costly preparations are *not* usually required. You save time, money, and metal on bridges, rolling stock, signal equipment, tanks, buildings, towers, etc. See how Rust-Oleum can save you money . . . why major railroads all over the country rely upon Rust-Oleum. Get the *complete* story from a Rust-Oleum Railroad Rust Preventive Specialist!

RUST-OLEUM CORPORATION

2592 Oakton Street, Evanston, Illinois

Write for your copy of the new Rust-Oleum Catalog, *today!* Available in many colors, aluminum, and white.

Two for one plus

On the Sellers End Drive Axle Lathe you can not only turn and burnish up to twice as many axles per day as you can on an old style axle lathe, *but you can also turn and burnish the journals of mounted wheel sets.*

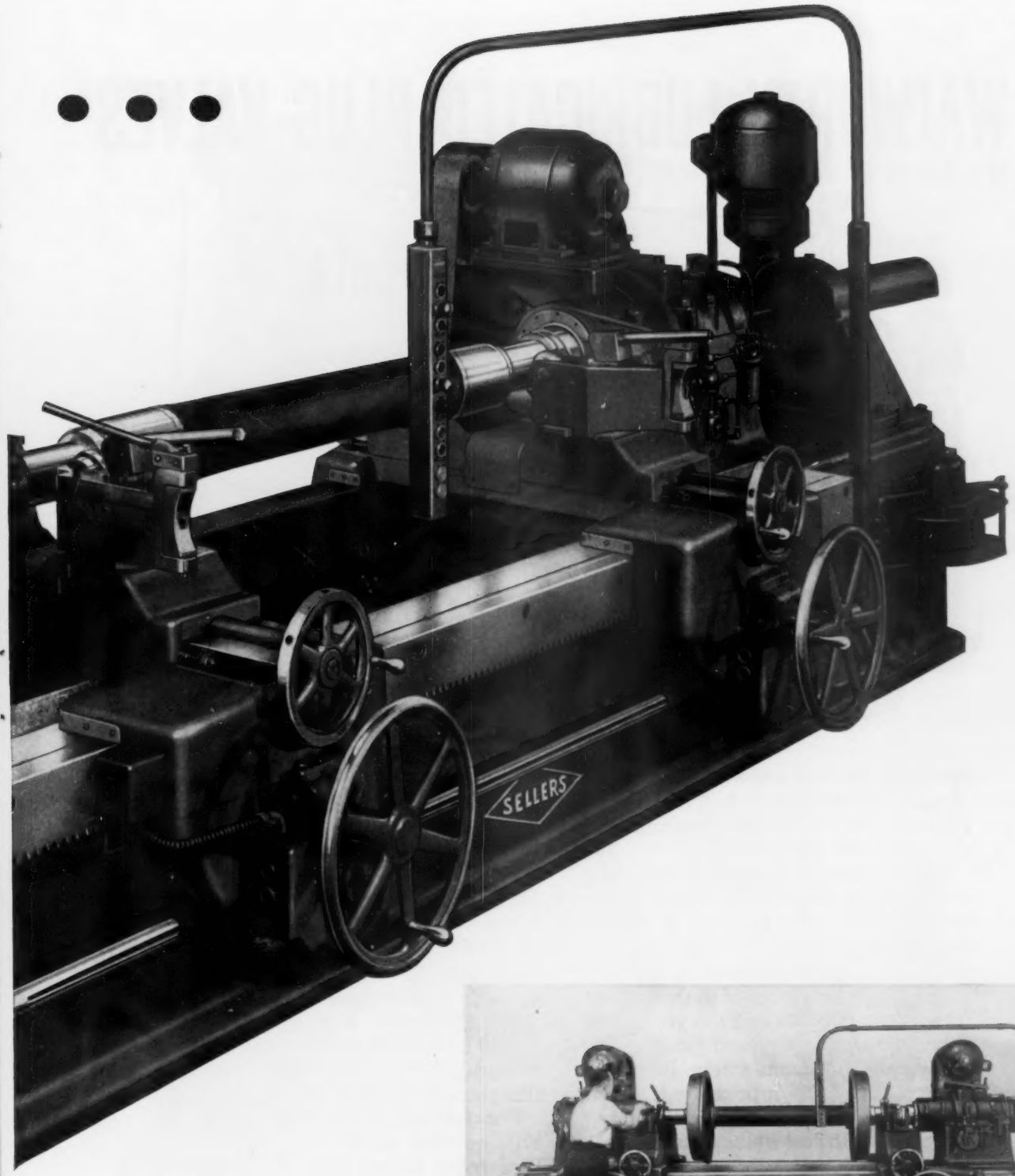
There are no filler blocks to remove—nothing to change on the machine—just take out an axle and put in a wheel set. It's as simple as that. And you can turn and burnish up to twice as many journals as you can on old style, center-drive journal truing lathes.

And if you want to machine an axle completely from end to end, you can do it on the Sellers End Drive Axle Lathe because there is no center drive to interfere.

Sellers End Drive Axle Lathe

CONSOLIDATED MACHINE TOOL

Wholly owned subsidiary of Farrel-



Truing Journals on
Sellers End Drive Axle Lathe

CORPORATION, ROCHESTER, N. Y.

Birmingham Company, Incorporated

WALWORTH LUBRICATED PLUG VALVES

offer these advantages

- . . . Direct port opening
- . . . Quarter turn opens or closes valve
- . . . Dead tight shut-off
- . . . Freedom from attack by fluids being handled
- . . . Pressure sealed
- . . . Made in a complete line. Sizes from ½" to 30" for pressures from 175 to 5,000 psi., and for vacuum requirements

THESE are just a few of the reasons why Walworth Lubricated Plug Valves give "top" performance on many *difficult* services.

All Walworth Lubricated Plug Valves employ special insoluble lubricants which protect the plug and body against contact with the line fluid, thus combatting erosion and corrosion.

The lapped surfaces of the valve are "pressure sealed" when the valve is in either the open or closed position. By turning the lubricant screw, lubricant is forced under high pressure through a grooving system that completely encircles the ports as well as the top and bottom of the plug.

The lubricant seals the valve against leakage, and reduces friction between plug and body. This permits easy, quick, full-opening, or tight shut-off with only a quarter turn of the plug.

Number 1700 (illustrated) is a Steel-iron valve, wrench operated, designed for a working pressure of 200 pounds WOG (water, oil, or gas). Valves are available in either screwed or flange types. Screwed type have API line pipe thread lengths. Flanged type (No. 1700F) is faced and drilled to American Standard for 125-pound cast iron flanges unless otherwise specified.

For further information about No. 1700 as well as the complete line of Walworth Lubricated Plug Valves, write for catalog.

WALWORTH

valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

(*Continued from p. 98*)

the railroads are saving more than $600,000,000 a year in fuel costs through diesel operation. As railroads take advantage of the now available factory rebuild services, he said, that they will open up "an equally important new avenue to savings."

The Jacksonville plant is one of six such factories operated by Electro-Motive at strategic centers across the country. The others are at Halethorpe, Md.; Robertson, Mo.; LaGrange, Ill.; Los Angeles, and Emeryville, Cal. A seventh is under construction at Salt Lake City.

Railroad men from the southeast and civic leaders of Jacksonville were guests at a luncheon, plant inspection and reception given by Mr. Dezendorf and his staff to make the formal opening. The Southern and Southwestern Railroad Club moved its monthly meeting from the regular place, Atlanta, to Jacksonville so its members could attend the opening.

■

PRESSED STEEL CAR COMPANY.—*Robert W. Clyne* has been elected vice-president—marketing, at Chicago. Mr.

R. W. Clyne

Clyne was previously an officer and divisional sales manager of American Steel Foundries Company.

■

VAPOR HEATING CORPORATION is now located at 6420 W. Howard street, Chicago.

■

FLEXIBLE STEEL LACING COMPANY.—*John Bakke* will cover Michigan, Indiana and western Kentucky for Flexible Steel, succeeding *George W. Gramer* who has retired.

■

GENERAL ELECTRIC COMPANY.—*R. A. Miller* has been named manager of manufacturing of the locomotive and car equipment department, at Erie, Pa. Mr. Miller has been associated with the company at Erie since 1923, his most recent position being manager of the employee relations section of the locomotive and car equipment department.

A complete locomotive rebuilding and overhaul service has been established by G.E. at Erie, Pa. The new facility, in addition to 31 service shop facilities available to locomotive users throughout the country, has been set up to fill the need for a complete locomotive rebuilding service among industrial locomotive users and

(*Continued on p. 114*)

CORROSION

IT CAN'T HAPPEN HERE!

Intensive studies made by railway authorities show that one-third of the total cost for freight car repairs is attributable to corrosion damage. High resistance to corrosion, eliminating costly maintenance, is one of the many advantages of Commonwealth *one-piece cast steel* underframes for freight cars.

Since 1927, several hundred gondola cars with Commonwealth cast steel underframes have been in continuous sulphur carrying service and have been exposed to the consequent chemical actions as well as to all types of atmospheric conditions. Periodic inspections of these cars have revealed practically no evidence of deterioration in the cast steel underframes. They have presented no maintenance problems and orders have been duplicated several times.

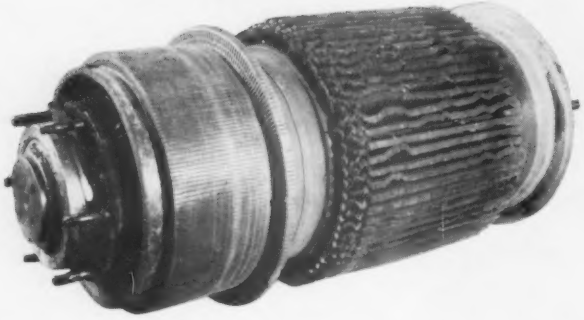
For flat cars, pulpwood cars, sulphur carrying cars, ore cars, depressed center cars, and others, Commonwealth one-piece underframes with metal distributed to the greatest advantage, provide exceptional strength without increase in weight, and eliminate welded or riveted joints or connections. Thus, in addition to providing increased resistance to corrosion, other maintenance costs are eliminated and *maximum availability* of equipment is obtained.

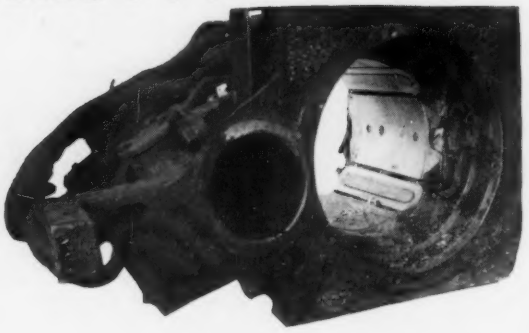
For true upkeep economy and long dependable service-life, build your cars with Commonwealth Cast Steel Underframes.

GENERAL STEEL CASTINGS

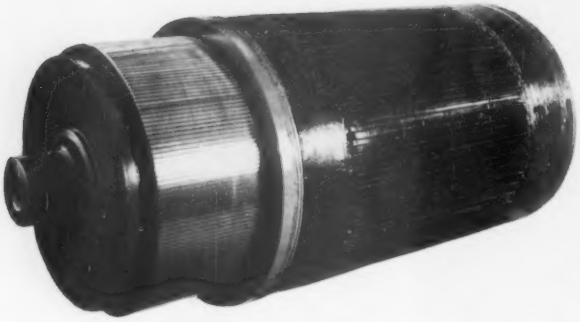
GRANITE CITY, ILL. EDDYSTONE, PA.

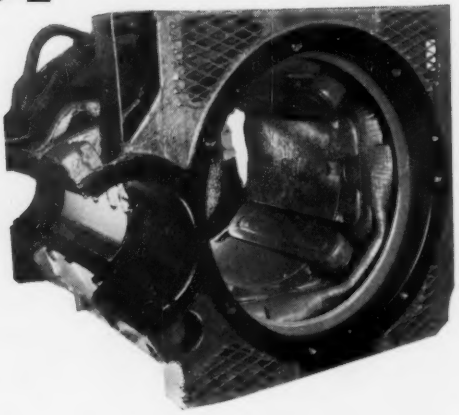
when you have this...





and need this FAST—





call National

In-plant manufacture of all copper wire and insulating materials saves precious days

---

If you do your own repairs, National fast service means big savings on winding kit inventory costs

Call your nearby National field engineer today, or drop us a line for his name and address.

NATIONAL ELECTRIC COIL COMPANY

COLUMBUS 16, OHIO, U. S. A.

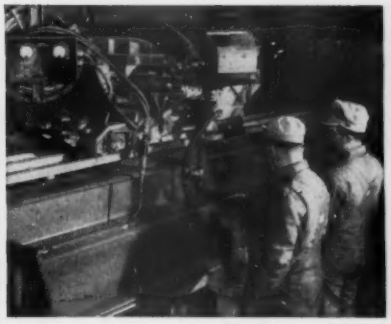
TRADE MARK

ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

For Every Welding Step in Car Building

"UNIONMELT" WELDING

Bolster sub-assembly



Center sill

Center plate

Slope Sheets

Crossridge Sheet

Side Stakes

Fill out and send in the handy coupon to get your copies of OXWELD's reprints on UNIONMELT welding for car building.

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A Division of Union Carbide and Carbon Corporation

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Chicago 1, Illinois

Gentlemen:

Please send me your reprints on UNIONMELT welding in car building.

Name _____ Position _____

Railroad _____

Address _____

(*Continued from page 110*)

railroads operating comparatively small fleets of motive power. The program includes all kinds of heavy maintenance and overhaul rebuilding, modernization, conversion and wreck-rebuild work.

■

HYSTER COMPANY.—*Jack Wright*, northern district manager on the west coast, has been appointed district manager, northwestern district, at Chicago. *James N. Rector*, manager of the Hyster retail store in Chicago, has been transferred to Atlanta as district manager, southeast territory.

■

H. K. PORTER COMPANY, WATSON-STILLMAN COMPANY. — *H. E. Elliott* has been appointed sales manager of Watson-

H. E. Elliott

Stillman. Mr. Elliott has been associated with the company for many years in sales and engineering.

■

ACME STEEL COMPANY.—*Albert G. Karstens* has been appointed national account supervisor of the steel products division at Chicago. Named as special representative—central sales is *Theron P. Schulz*, sales representative.

■

SECURITY LOCKNUT CORPORATION.—*D. V. Maher & Co.*, 900 Marshall building, Cleveland 13, and *W. A. Blackford*, 9330 Thermal street, Oakland, Cal., have been appointed sales representatives of Security Locknut in the railroad field.

■

INDUSTRIAL BROWNHOIST CORPORATION.—*W. W. Mossgrove* has been appointed assistant to sales manager. Mr. Mossgrove was previously in the sales and service departments.

■

EDGEWATER STEEL COMPANY.—*Robert C. Carrick* has joined Edgewater as service engineer, at Oakmont, Pa. Mr. Carrick was formerly associated with National Aluminate Corporation.

■

DANA CORPORATION.—*Robert P. Lewis* has been appointed director of engineering and *Robert R. Burkhalter*, executive engineer.

■

PITTSBURGH SCREW & BOLT CORP. —*A. Barr Comstock, Jr.*, sales manager of the Philadelphia district, has been appointed general manager of sales, with

THE ENGINEER'S REPORT

DATA

LUBRICANT	RPM Delo Oil R.R.
UNIT	Diesel locomotive
SERVICE	Transcontinental freight—grades to 1.8%
PERIOD	3 years
LOCATION	Minneapolis, Minn., to Wenatchee, Wash.
FIRM	Great Northern Railway

504,851 freight miles in 3 years without overhaul!

ONLY 0.002 INCH WEAR was miked on liners of this locomotive's engines when they were inspected after 504,851 actual miles. Lubricated with RPM DELO Oil R.R., the engines operated without trouble of any kind during 3 years of tough service hauling freight over the Continental Divide. Representative piston and liner, above right, shown as they appeared when taken from one of the engines, demonstrate good condition of parts after this extended service. All rings were free when engine was torn down. Overhaul was performed only because of time and mileage on engine, which was estimated to have idled the equivalent of 100,000 miles in addition to actual mileage. Besides low wear of liners, other wear measurements (inches) were only: Wrist Pin—0.001; Wrist Pin Bushing—0.0015; Carrier Bushings—0.0015; Oil Ring—0.003.

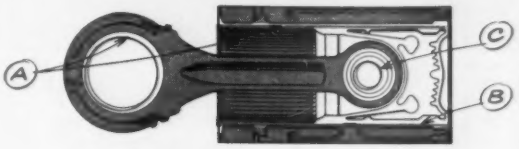
REMARKS: Great Northern Railway's diesels haul heavy freight up grades as severe as 1.8%. Engines operate in dust and heat in summer, snow and extreme cold in winter.

FREE CATALOG: "How to Save Money on Equipment Operation," a booklet full of valuable information, will be sent you on request to Standard Oil Company of California, 225 Bush St., San Francisco, Calif.

RPM DELO LUBRICATING OILS

TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.

How RPM DELO Oil R.R. prevents wear, corrosion, oxidation



A. Special additive provides metal-adhesion qualities...keeps oil on parts whether hot or cold, running or idle.

B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring-sticking. Detergent keeps parts clean...helps prevent scuffing of cylinder walls.

C. Special compounds stop corrosion of any bushing or bearing metals and foaming in crankcase.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Barber, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

Manufacturers' Literature

Following is a compilation of free literature, pamphlets and data sheets offered by manufacturers to the railroad industry. Circle the number (s) on the coupon below to receive the information desired; the requests will be sent direct by the manufacturers.

1. BLAST CLEANING EQUIPMENT. *Ruemelin Mfg. Co.* 8-page, 2-color Bulletin 32-B "Ruemelin Blast Cleaning Cabinets" gives construction details, specifications and industrial applications of Ruemelin blast cleaning cabinets, equipment and dust control equipment.

2. SINGLE POINT CARBIDE TOOLS. *The DoAll Company.* 12-page brochure illustrates, describes and gives specifications of carbide tipped single point cutting tools, including standard unground carbide tips, solid carbide inserts and carbide tips for lathe and grinder centers.

3. SUPERFINISHER. *Gisholt Machine Company.* 32-page file-type folder (form 1169) "Gisholt Superfinishers" illustrates and gives complete specifications on Gisholt Superfinishers and attachments.

4. DIESEL ENGINES & LOCOMOTIVES. *Klockner-Humboldt-Deutz A.G.* 8-page multi-colored folder (D-46-E) "Deutz—The Cradle of the Modern Internal Combustion Engine" shows the many uses of the Deutz line of diesel engines, and special locomotives (mining, narrow gauge diesel, and diesel shunting). Also available are special colored brochures completely describing with detailed drawings "Diesel Engines for Railcars," "Air-Cooled Diesel Engines," and "Diesel Shunting Locomotives" (28 B.H.P., 55 B.H.P., 107 B.H.P., 130 H.P., 165 H.P., 225 H.P.) *Must specify folders by number or title.*

5. HOSE FITTINGS. *Stratoflex Inc.* Bulletin S-1 illustrates and gives specifications for the Stratoflex line of detachable hose fittings and hose assemblies for use with oil, fuel, water, air, gases and many chemicals.

6. RAILROAD DIESELS. *Caterpillar Tractor Co.* 8-page, 2-color booklet (form 30754) "On Track for Profits" features cutting railroad operating costs with Diesels, and pictures locomotives powered by Caterpillar Diesel and Cat Diesel Electric Sets on a variety of switching and line jobs.

7. TAPPING SCREWS. *Townsend Company.* Booklet (#TL-88) describes in detail seven types of screws which form their own threads as they enter various types of materials, and includes a selection chart describing what screws are recommended for different materials.

8. FASTENERS. *Southco Division, South Chester Corp.* 24-page sectionalized handbook (Catalog B2) describes, illustrates, and gives specifications for the Southco fastener line in seven different fastener type sections.

9. TUBE EXPANDERS. *Gustav Wiedeke Co.* Folder (#402) describes and illustrates tube expanders, tube cutters and accessories, along with a list of Wiedeke distributors.

10. TIME DELAY RELAYS. *A'G'A Division, Elastic Stop Nut Corporation of America.* New catalog bulletin SR-3 describes the complete line of Agastat solenoid-actuated, pneumatically-controlled time delay relays, with specifications, mounting dimensions and wiring diagrams.

11. HARDNESS CONVERSION TABLES. *The International Nickel Company, Inc.* A handy wallet size celluloid card gives approximate relationship between Brinell, DPH(Vickers), Rockwell and Shore Scleroscope hardness values and corresponding tensile strengths of steels.

12. HOSE CLAMP APPLICATIONS. *Punch-Lok Company.* 24-page pocket-sized folder #F-280-1 "Clampways Ideas" contains interesting case histories of the most useful uses for Punch-Lok hose clamps.

13. STEEL CASTING MATERIAL SELECTION. *Lebanon Steel Foundry.* Circle "L" Slide Chart gives facts on steel casting material selection, gives reference data on 19 carbon and low alloy grades and 17 stainless and corrosion resistant grades, and gives similar reference facts on 8 different Lebanon heat resistant cast steel alloys.

14. RAILROAD OIL FILTERS. *Wix Corporation.* 28-page catalog (RR-53) describes and illustrates photographically and with diagram drawings the Wix line of railroad oil filters; titled "Oil Filter Cartridges for Diesel Fuel and Lubrication," it contains the only index and cross reference ever compiled on these filters.

15. SIMPLIFIED STEAM SYSTEM. *Minneapolis-Honeywell Regulator Co.* 6-page folder "A Better Way Is Found to Do an Old Job" describes and illustrates with a diagrammatical sketch a new Honeywell steam heating system installation for passenger cars.

Reader Service Department
Railway Locomotives and Cars
30 Church Street, New York 7, N. Y.

APRIL, 1954

Please send literature circled below:

1 2 3 4 5 6 7 8 9
10 11 12 13 14 15

Name ..... Title or Position .....

Company .....

Address .....

City ..... Zone ..... State .....

headquarters in Pittsburgh. ***Charles M. Sutlive***, manager of sales of the Southeastern district at Savannah, has been named manager of sales of the Philadelphia district with headquarters in the Suburban Station building.

■

ANACONDA WIRE & CABLE CO.—*Albert H. Leader* has been appointed district manager, Seattle office, succeeding *Lloyd Wolfe*, retired.

■

INTERNATIONAL EQUIPMENT COMPANY.—*Allan N. Campbell*, vice-president of International Equipment Company, Industrial Equipment Company and

A. N. Campbell

Service Specialty Company, Montreal, has been elected president. Mr. Campbell succeeds *George Verner*, who has retired as president and chairman of the board.

■

LEWIS-SHEPARD PRODUCTS, INC.—*Howard M. Palmer*, general sales manager, has been appointed sales vice-president.

H. M. Palmer

Joseph S. Pelles has been appointed sales manager, transportation industries.

■

INTERNATIONAL NICKEL COMPANY.—*J. M. Weldon*, who has held various assignments in the sales, executive and other departments, has been transferred to the general sales department as assistant to vice-president. *C. J. Bianowicz* has been named manager of the nickel alloys department, succeeding the late *H. D. Tietz*. Mr. Bianowicz was previously in charge of the

(Continued on p. 120)

America's Railroads Agree:

DY-NAMIC BALANCING IS NECESSARY TODAY!

AIR CONDITIONING operates with less vibration!
WHEELS run smoother!
ARMATURES last longer!
BEARINGS wear slower!

At B & O Mt. Clare Shops, Baltimore, Md. every traction motor and generator armature is Dy Namically Balanced before reassembly, to reduce vibration and extend motor life.

A partial list of railroads using "Bear" Machines to balance traction & generator armatures, diesel crankshafts and armatures, air conditioning equipment, etc

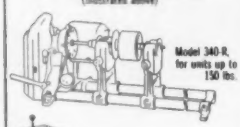
- The Pullman Company
- Chicago, Rock Island, & Pacific R. R. Co.
- Illinois Central System
- Chicago & Eastern Illinois R. R.
- Missouri-Kansas-Texas R. R. Co.
- Chicago, Burlington & Quincy R. R.
- Norfolk & Western R. R.
- Reading Company
- Baltimore & Ohio R. R.
- Chicago, Milwaukee, St. Paul & Pacific
- New York Central Railroad
- Fort Worth & Denver R. R.

Special "Bear" Models for Railroad Balancing Requirements make it Easier, More Economical to get the Benefits of Dy-Namic Balancing

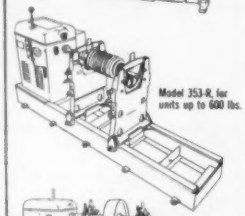
Today, there is sufficient performance data accumulated by railroads to make it evident that Dy-Namic Balancing is an important factor in cutting railroad maintenance costs. Dozens of leading railroads, such as those listed above have found that the adoption of Dy-Namic Balancing as a standard maintenance operation has been more than warranted by savings in lower costs, repairs, labor and reduced lay-up time. "Bear" Models, specifically designed for railroad work bring you ALL THE BENEFITS of DY-NAMIC BALANCING because:

- they make it possible to balance armatures with minimum time and effort.
- they enable operator to change from one shaft size to another in minutes.
- they are highly accurate and dependable in all measurements.
- they prevent the "weaving action" often caused by static balancing alone because they do both static and dynamic balancing simultaneously.
- they are easy to operate . . . do not require skilled technicians.

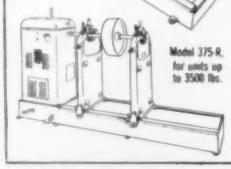
Model 400-R, for units up to 8 tons (Illustrated above)



Model 340-R, for units up to 150 lbs.



Model 353-R, for units up to 600 lbs.



Model 375-R, for units up to 3500 lbs.

FREE BULLETINS

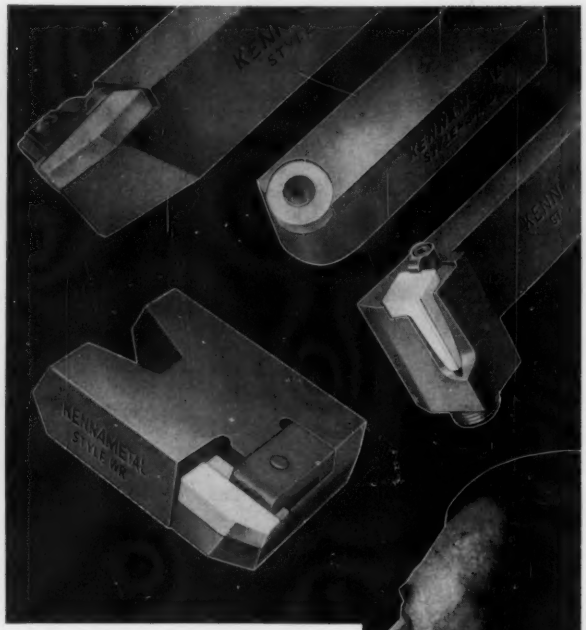
Get full details by sending for your FREE copies of these "Bear" Bulletins on RAILROAD DY-NAMIC BALANCING.

Write Bear Mfg. Co., Dept. R-2, Rock Island, Ill.

"BEAR"®

STATIC AND *DY-NAMIC BALANCING* MACHINES

665



WHICH TOOL...

CAN SAVE *YOUR* SHOP THOUSANDS OF DOLLARS?

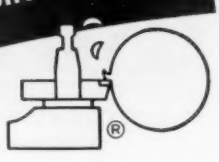
The answer is—any or all of them. These Kennametal cemented carbide tools wear from 5 to 20 times longer, and machine steel and cast iron up to 10 times faster than steel tools. They are proving capable, in railroad shops, of saving up to 90% of tooling costs, and ⅔ of machining time.*

You don't necessarily need the latest machines to use Kennametal tools. Extremely strong and durable—they cut effectively at speeds obtainable on all commonly-used lathes, boring mills, and milling machines that are in reasonably good condition.

Buy tools on what they do—not what they cost. A few extra pennies invested in each Kennametal tool can save your shop thousands of dollars. Ask our district engineer to demonstrate. Kennametal Inc., Latrobe, Pa.

*Performance studies will be sent upon request.

KENNAMETAL
Modern RAILROAD SHOP TOOLING



This advertisement is one of a series currently running in national business magazines. We sponsor it in the belief that such a series will help make industry more aware of the outstanding record of railroad progress and achievement.

They're hauling MORE FREIGHT with FEWER CARS!

Over the years your freight tonnage has increased by millions, and now it's being hauled—*more efficiently*—with 25% fewer cars!

This is only one of the many reasons why railroads offer you better freight service at a bigger value than ever before. Today, classification yards have electronic equipment. Motive power is modern, car and track maintenance systems mechanized. Thousands of bigger, better cars are averaging over 50% higher speeds!

Carrying heavier loads at higher speeds meant new problems in running gear design. As the leading producer of running gear, American Steel Foundries took the initiative and worked with railroads on a smoother-riding, high-speed freight car truck. Toughest nut to crack: passenger train speeds *at freight car costs.*

The answer was the ASF Ride-Control® Truck. Railroads saw in this new, modern truck *an economically practical way to speed shipments.* Its unprecedented use is another example of how railroad progress is keeping in step with industry's shipping needs.

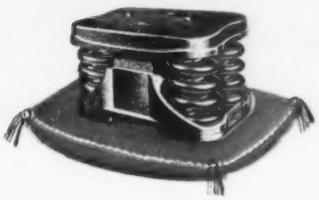
ASF Ride-Control Truck—first to make modern freight speeds possible. More of these smoother-riding trucks are specified than all others combined!

American Steel Foundries

World's largest producers of railroad running gear

Executive Offices: Wrigley Building, Chicago 11

The mechanical principles of the Ride-Control Truck are now built into the "Ride-Control® Package"—which makes older cars suitable for unrestricted use, *at costs that are realistic.*



Average ton-miles per car per day is 61% higher than 1936-1940 average! Industry benefits from this higher efficiency—and from today's faster, smoother-riding, modern car pool.

department's industrial sales. *D. W. Machon* has been appointed head of a newly established cobalt section of the nickel sales department.

■

AMERICAN LOCOMOTIVE COMPANY—*Duncan W. Fraser*, chairman of the board of American Locomotive Company and Montreal Locomotive Works since 1945, has retired.

D. Fraser

Martin Ettington, Alco products director of engineering, has been appointed general manager of engineering, at Schenectady, in charge of all product engineering activities at each of Alco's six plants.

■

AMERICAN BRAKE SHOE COMPANY, BRAKE SHOE AND CASTING DIVISION.—*George E. Anne*, assistant vice-president, has been appointed vice-president.

■

UNION ASBESTOS & RUBBER CO.—*Chester S. Stackpole* has been appointed general sales manager, heating and cooling division, at Chicago.

■

GRIFFIN WHEEL COMPANY.—*E. Q. Sylvester* has been elected president at Chicago.

After receiving a B.S. degree in mechanical engineering from Massachusetts Institute of Technology in 1934, Mr. Sylvester worked first for a milk cooler manufacturer, and later for a tool steel jobber, where he became chief metallurgist. Returning to M.I.T. for graduate work in mechanical engineering and metallurgy, he designed and built metals fatigue machines; worked with A. B. DeForrest in development of Magnaflux and Magnaglo methods of metals inspection; and developed an electric strain gage. When American Steel Foundries bought one of the fatigue machines in 1937, Mr. Sylvester was retained by the company to institute a metals research program. A year later he joined the company's engineering staff and in 1940 was transferred to its Griffin Wheel Company division and placed in charge

E. Q. Sylvester

of sales in New England territory. After four years in Boston, where he devoted much of his time to design of a quenched iron wheel, he returned to Chicago as assistant to president of Griffin. In 1947 he became vice-president and a director, and in 1952 was named executive vice-president. He was also named president of Griffin Steel Foundries, Ltd., which has a plant at St. Hyacinth, Que. He assumed the presidency last December.

■

A. M. BYERS COMPANY.—*A. B. Drastrup*, manager of steel sales and assistant to president, has been elected executive vice-president. *J. F. Byers, Jr.*, assistant to president, and *B. M. Byers*, general manager of wrought iron sales, also have been elected vice-presidents, the latter in charge of sales.

DAYTON RUBBER COMPANY.—*Walt W. Hutchinson* has been appointed field sales manager, Railway Division, with headquarters in Chicago. Mr. Hutchinson was formerly district manager of the Southeastern territory of the Railway Division at Cincinnati.

■

EDGEWATER STEEL COMPANY.—*D. W. McGeorge*, vice-president and general sales manager, has been named vice-president—sales, and *Walter M. Cree*, assistant general sales manager, has been promoted to general sales manager. *W. C. Heiner, Jr.*, and *V. P. Jakovac* have bebecome manager and assistant manager, respectively, of railroad sales.

■

UNION CARBIDE & CARBON CORP., LINDE AIR PRODUCTS COMPANY.—*L. W. Jordan* has been appointed vice-president—Pacific Region. Mr. Jordan was previously manager of the region.

■

SAFETY CAR HEATING & LIGHTING CO.—*Henry T. Stetson*, president, has been elected chairman of the board, and has been succeeded as president by *Harold F. Kneen*.

Henry T. Stetson

Mr. Stetson became associated with the company in 1923 as attorney. He was elected director in 1924, vice-president in 1930, and president in 1951.

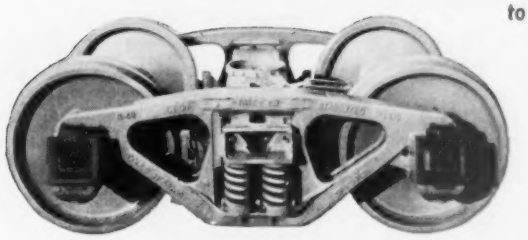
(*Continued on p. 122*)

HOLLAND A-7-A
UNIT SNUBBER
50-TON 4-SPRING GROUP

NEW HOLLAND RS-1 *Ride Stabilizer* UNIT FOR EXISTING EQUIPMENT

HERE'S a high efficiency Friction Snubbing device for application to existing freight car trucks, which is different from all others. Use it with either standard A.A.R. 1915 or 1936 (1⅝" travel) coil springs or new A.A.R. long travel coil springs.

It is applied in present Freight Car Truck Bolsters not equipped with built-in snubbing, and makes them comparable in performance to your new cars equipped with built-in ride stabilization.



Modern High Speed Freight Car Truck
with built-in Ride Stabilizer

Write for Bulletin #16-A for complete technical details on the above Ride Stabilizer Unit *(RS-1) for existing equipment.*

HOLLAND COMPANY
332 South Michigan Avenue • Chicago 4, Illinois

311RR

Mr. Kneen, formerly executive vice-president, is a graduate of Cornell University. Prior to his association with Safety

Harold F. Kneen

in 1952, he was vice-president of manufacturing and a director of Lincoln Electric Company.

■

ACME STEEL COMPANY.—*Herbert F. Middleton*, district sales manager of Acme Steel Products division at San Francisco, has been named western area sales manager at Los Angeles, succeeding *Squire J. Johnson*, who has assumed new duties with the parent company. Mr. Middleton's successor is *William H. Smythe, Jr.*, special representative, who in turn has been replaced by *Charles G. Moreau*.

■

RAIL & FLANGE LUBRICATOR CO.—*Chester A. Olsen* has been appointed sales and service representative, midwest region, with headquarters at Chicago.

■

REPUBLIC STEEL CORPORATION.—*Sam A. Seckler*, assistant district sales manager, at Chicago, has been named assistant manager of sales for the alloy steel division, at Massillon, Ohio, succeeding *Clyde E. Roberts*, who is now manager of sales of the division.

■

JOSEPH T. RYERSON & SON, INC.—*Weaver E. Falberg*, manager of the alloy steel division at Chicago, has been appointed assistant general manager of sales at Chicago. *Alfred J. Olson*, assistant sales manager, has been appointed sales manager, also at Chicago.

■

GOLDEN ANDERSON VALVE SPECIALTY COMPANY.—The general offices of Golden Anderson have been moved to new and larger quarters at 1232 Ridge avenue, Pittsburgh.

■

THRALL CAR MANUFACTURING COMPANY.—*Richard L. Duchossois* has been appointed president to succeed *A. J. Thrall*, who has been named chairman of the board.

■

ELECTRIC STORAGE BATTERY COMPANY.—*Joel A. Fitts*, sales engineer at Chicago, has retired after more than 38 years of service.

EXIDE INDUSTRIAL DIVISION.—*Thomas H. Dooling*, Pacific Coast sales manager, has been appointed western industrial sales manager. *Herbert F. Sauer* has been named

midwestern industrial sales manager. *C. W. Wilson*, assistant manager, succeeds Mr. Sauer as branch manager at Chicago. *Willard W. Grundel* has been appointed San Francisco branch manager.

■

PENNSYLVANIA SALT MANUFACTURING COMPANY.—*W. Scott McCormick* will represent the maintenance chemicals department of Pennsylvania Salt in the transportation field, covering Ohio and counties in western Pennsylvania and southern Michigan.

■

RED-CO.—*Ralph A. Corley, Jr.*, who has been active in the railway supply field for some 15 years, has set up a railway sales agency, known as Red-Co., at 90 West street, New York.

■

SKF INDUSTRIES, INC.—*Richard H. DeMott*, chairman of the board and president of SKF, has received the Stevens Honor Award, bestowed each year by Stevens Institute of Technology on outstanding figures in American life. The award was conferred on Mr. DeMott at the annual dinner of the Stevens Alumni Association in New York on February 26.

■

APEX RAILWAY PRODUCTS COMPANY; M & J DIESEL LOCOMOTIVE FILTER CORP.—*Edward T. Doherty* has been elected president of Apex and M & J, at Chicago succeeding *L. F. Duffy*, who has resigned.

■

SUPERIOR STEEL & MALLEABLE CASTINGS CO.—*W. C. Wertz* has been appointed district sales representative at Chicago.

■

FAIRBANKS, MORSE & CO.—*Glenn A. Parker*, manager of the diesel engine department of the Kansas City, Mo., branch of Fairbanks, Morse, has been appointed branch manager there, succeeding *W. W. Guernsey*, retired.

■

EVANS PRODUCTS COMPANY.—*W. B. Gilkey*, who has been engaged in sales and personnel work, has been named to the sales engineering staff of Evans Railroad Loading and Equipment division.

■

OAKITE PRODUCTS, INC.—Research and service laboratories of Oakite have been moved to larger quarters at 350 Hudson street, New York.

■

KOPPERS COMPANY, WOOD PRESERVING DIVISION.—*J. W. Sullivan*, area sales manager at Houston, has been named manager of the Colorado district, at Denver, succeeding *R. C. Johnson*, appointed special representative. *H. O. Brown* succeeds Mr. Sullivan at Houston.

■

MOTOR OILS REFINING COMPANY.—*R. E. Poindexter*, lubrication engineer, has been appointed general sales manager at Lyons, Ill.

■

McDOUGALL-BUTLER COMPANY.—*Parker Paints & Supplies* has been appointed Cincinnati distributor for McDougall-Butler. The Parker company is located at 2128 Madison road.

■

METALLIZING ENGINEERING COMPANY—Metallizing Engineering is constructing a plant at Westbury, Long Island, which will have on a single floor over 20,000 sq. ft. of office space and 45,000 sq. ft. of manufacturing, storage and shipping areas. The building, scheduled for completion in July, will be of brick masonry, steel and glass.

■

PULLMAN-STANDARD CAR MANUFACTURING COMPANY.—*Norman E. Bateson*, associate director of the engineering design division, has been appointed deputy director of the research and development division at Hammond, Ind.

■

A. M. BYERS COMPANY.—*John W. Rapp* has joined the A. M. Byers company as railway sales representative—central district, at Chicago and St. Louis.

Obituaries

GEORGE F. HESSLER, 64, vice-president in charge of all sales activities, and a director and member of the executive committee of Graybar Electric Company, died in Venice, Fla., February 1.

■

M. K. TATE, 67, assistant to president, Baldwin-Lima-Hamilton Corporation, at Washington, D.C., died in that city on March 5, from a heart attack.

PERSONAL MENTION

Atchison, Topeka & Santa Fe

E. E. CHAPMAN, mechanical assistant at Chicago, has retired.

E. E. Chapman

Born: January 1884 at Mankato, Kan.
Education: Degree in Mechanical Engineering, Purdue University, 1907.
Career: Became a test department assistant on the Santa Fe in December 1909. Entered the army on a special assignment in August 1917, returning to the Santa Fe as assistant engineer of tests in June 1919. Subsequently served as engineer of tests, mechanical assistant and engineer of tests until July 1, 1940, when he was appointed mechanical assistant at Chicago.
Memberships: American Railway Engineering Association, American Society of Mechanical Engineers, Locomotive Maintenance Officers' Association, Railway Fuel & Traveling Engineers' Association, Western Railway Club, American Society for Testing Materials, Society of Automotive Engineers, and Mechanical Division, Association of American Railways, on the Wheel Committee of which he has been chairman since 1946.

E. B. FIELDS, engineer of tests at Topeka, Kan., appointed mechanical assistant, with headquarters at Chicago.

H. K. LANNING, mechanical and research engineer at Topeka, assumes duties also of engineer of tests.

H. F. MACKEY, mechanical superintendent at Shopton, Iowa, transferred to Chicago.

Belt Railway of Chicago

LAWRENCE J. BRASHER, master mechanic, appointed superintendent of motive power at Chicago.

Canadian Pacific

R. B. WINSHIP, mechanical engineer (car) at Montreal, has retired.

CHARLES HASSALL, engineer of car equipment at Montreal, has assumed also the duties of mechanical engineer (car).

W. F. SINCLAIR, engineer of diesel equipment at Montreal, appointed to newly created position of engineer of motive power. Former position abolished. Position of mechanical engineer (locomotive) also abolished.

A. E. MCGRUER, general electrical engineer at Montreal, appointed engineer of electrical equipment. Former position abolished.

Florida East Coast

C. F. REEDY, superintendent air-conditioning and steam-heat equipment at St. Augustine, Fla., appointed superintendent car department.

E. H. SCHOEDINGER, master mechanic, has had jurisdiction extended to cover both locomotive and car departments at Buena Vista, Fla.

JOHN SIMS, general foreman, appointed assistant master mechanic at Buena Vista, Fla.

Minneapolis, St. Paul & Sault Ste. Marie

A. G. GREENSETH, general mechanical superintendent at Minneapolis, has retired.

C. F. GUGGISBERG, mechanical superintendent at Minneapolis, appointed general mechanical superintendent.

DONALD L. BORCHERT, assistant mechanical superintendent, appointed mechanical superintendent at Shoreham shops, Minneapolis.

D. L. BORCHERT, assistant mechanical superintendent at Minneapolis, appointed mechanical superintendent.

New York Central

E. R. HENKEL, general mechanical inspector at Minneapolis, appointed assistant mechanical superintendent.

C. A. PEASE, assistant industrial engineer—equipment, appointed industrial engineer—equipment, at New York.

G. K. ROUSH appointed assistant industrial engineer—equipment, at New York.

Pennsylvania

N. L. BUTTERS, supervisor methods and cost control, Panhandle division, appointed supervisor methods and cost control, Eastern division.

J. E. STACKHOUSE appointed supervisor methods and cost control, Maryland division.

A. L. GERFIN appointed assistant foreman methods and cost control, Wilmington passenger shop, Maryland division.

C. S. KIFER, foreman, Mingo Junction car shop, Panhandle division, appointed supervisor methods and cost control, Northern division.

EARNEST WINDISCH, gang foreman, Conway car shop, Eastern division, appointed supervisor methods and cost control, Lake division.

Pittsburgh & Lake Erie

JAMES J. WRIGHT, industrial engineer—equipment of the New York Central at New York, appointed manager of equipment of the P&LE.

Union Pacific

EZRA L. NEELEY, superintendent of shops at Pocatello, Idaho, appointed mechanical superintendent, Eastern district, with headquarters at Omaha, Neb.

JOSEPH D. KILLIAN, mechanical superintendent for steam power at Omaha, Neb., appointed mechanical superintendent, Northwestern district, with headquarters at Portland, Ore.

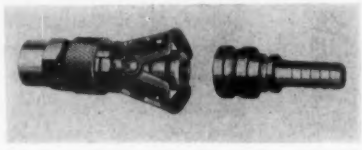
LOUIS L. HOEFFEL, master mechanic at Los Angeles, appointed mechanical superintendent, South-Central district, with headquarters at Los Angeles.

FRANK D. ACORD, district foreman at North Platte, Neb., appointed master mechanic at Los Angeles.

JOHN H. SINNAR, terminal master mechanic at Los Angeles, appointed assistant master mechanic at Los Angeles.

NEW DEVICES

(Continued from page 92)



Valve Coupling

This valve coupling, designated Quick-As-Wink, was recently introduced by C. B. Hunt & Son, Inc., Salem, Ohio. It is reported to give the operator complete and safe control of an air line, at whatever point between the compressor and air operated device, the coupling is installed.

The nose piece of the jaw half of the coupling is provided with an "O" ring held in a machined groove. When the coupling is connected, the nose piece slides into the recess of the connection half of the device.

The jaw or valve half is always connected to the live air supply line and is provided with locking jaws and a brass sleeve. After the jaws are closed around the connection half, the sleeve can be advanced to lock the jaws and permit live air to flow through the sleeve to the air-operated device.

These couplings are available in ¼ to ¾ in. sizes with hose, or male or female pipe threads. They can be used with air up to 250 lb. per sq. in. pressure.

What size is a quality fastener?

Here are two ELASTIC STOP® nuts.
Each has the familiar red locking collar. Each is self-locking, vibration-proof and can be reused many times. Each is a fast, readily assembled one-piece unit . . . will maintain accurate adjustment anywhere on a bolt. Each will afford positive protection against thread corrosion . . . prevent liquid seepage along bolts. Each is manufactured in quantity. Each is exactly controlled as to quality of raw material, finished dimensions, class of thread fit, seat squareness and finish. Each has a record for precision and uniformly high performance that is unmatched.

But . . . one measures 1/10 inch across the flats; the other, 4 inches. Between these two, there are more than 530 different hex nuts in the ESNA line. They are the result of variations in height, material, finish and size.

Look to ESNA for the top quality self-locking fastener that fits your need best.

ELASTIC STOP NUT CORPORATION OF AMERICA

ESNA® TRADE MARK / ROLLPIN TRADEMARK

Elastic Stop Nut Corporation of America
Dept. N58-423, 2330 Vauxhall Road, Union, N. J.
Please send the following free fastening information:

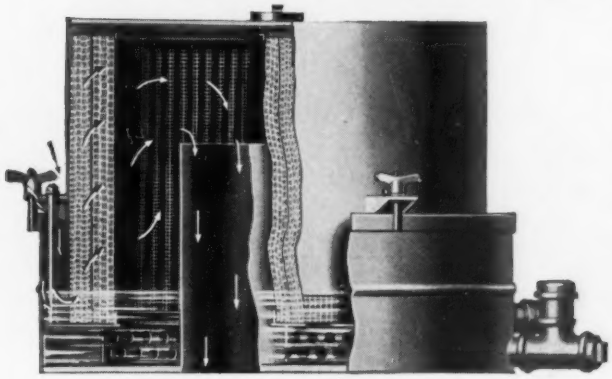
☐ ELASTIC STOP nut bulletin ☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name_____ Title_____
Firm_____
Street_____
City_____ Zone_____ State_____

—ADVERTISERS IN THIS ISSUE—

22 RAILROADS SWITCH TO NEW AIR-MAZE OIL BATH AIR FILTERS FOR DIESEL LOCOMOTIVES!

Reduce Diesel Engine Wear, Servicing Costs, Turbo-charger Maintenance



ALREADY 22 railroads have switched from panel-type filters to new Air-Maze oil bath filters on the air intakes of hundreds of diesel locomotives for freight, passenger and switching service. And reports indicate that the savings will equal their investment in only a year!

The new Air-Maze oil bath filter cuts engine overhaul costs because it scrubs intake air clean in a bath of oil. An oil-washed screen filter traps any remaining dust, passing only clean, oil-free air. Result: abrasive dust and dirt can't get through to wear out rings, ring grooves, and liners.

Oil bath filters reduce servicing costs, too. Compare these figures! In areas where airborne dirt concentrations are heavy, ordinary filters must be cleaned as often as twice a week. But, under the same conditions, Air-Maze oil bath filters go a month or more without changing oil!

Because there's less dirt build-up on the turbo vanes, these filters also reduce turbo-charger maintenance. Turbo wheels stay in balance, bearings last longer.

Filters are now available for the locomotives listed at left. For further information on how Air-Maze oil bath air filters can help you cut your diesel locomotive filtering costs, call on us or see your locomotive builder.

AIR-MAZE OIL BATH FILTER MODELS AVAILABLE FOR THESE LOCOMOTIVES

LOCOMOTIVE MFG.	HP	SERVICE
Electromotive	600	Switcher
Electromotive	1000	Switcher
Electromotive	1200	Switcher
Electromotive	2000	Rd. Pass.
Electromotive	2250	Rd. Pass.
Electromotive	1350	Rd. Freight
Electromotive	1500	Rd. Freight
Electromotive	1500	Rd. Switch.
Electromotive	800	Switcher
Alco-GE	800	Switcher
Alco-GE	1000	Switcher
Alco-GE	1300-1600	Rd. Switch.
Alco-GE	1500-1600	Rd. Freight
Alco-GE	2000	Rd. Switch.
Alco-GE	2250	Rd. Pass.
GE-Cooper Bessemer	600	Switcher
B-L-H	800	
B-L-H	1000	Switcher
B-L-H	1200	Switcher
B-L-H	1500	Rd. Switch.
B-L-H	1600	Rd. Switch. Rd. Freight
F-M	1000	Switcher
F-M	1200	Switcher
F-M	1600	Rd. Switch.
F-M	2000	Rd. Switch.
F-M	2400	Trainmaster

FREE BOOKLET. For complete information on these new developments in railroad diesel engineering, write for your free copy of the booklet, "Air-Maze Air Filters Specially Engineered For Railroads." The Air-Maze Corporation, 25000 Miles Ave., Cleveland 28, Ohio.

The biggest names in diesels are protected by Air-Maze filters

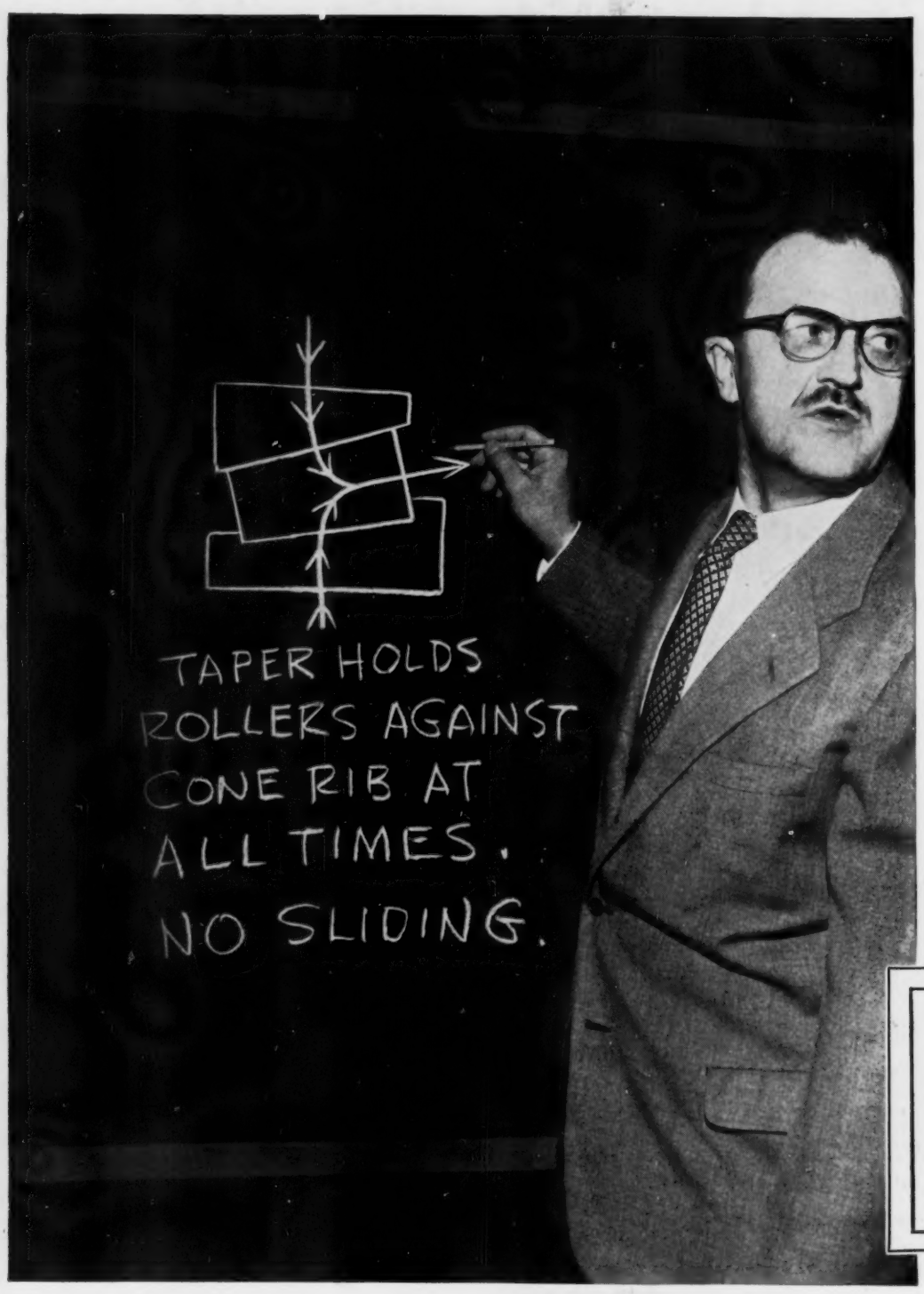
AIR FILTERS
SILENCERS
SPARK ARRESTERS

AIR-MAZE
The Filter Engineers

LIQUID FILTERS
OIL SEPARATORS
GREASE FILTERS

This month Dr. Oscar Horger demonstrates that positive roller alignment is one reason why:

The taper makes TIMKEN® the only journal bearing that <u>delivers</u> what you expect when you buy a roller bearing



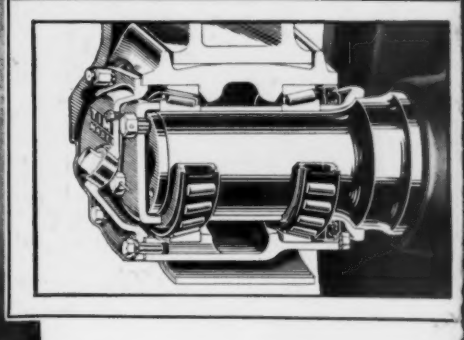
THERE are just two reasons for a railroad to buy roller bearings: to end the hot box problem and to cut operating and maintenance costs to a minimum. And there's just *one* bearing you can count on to deliver. It's the Timken tapered roller bearing, and here's why:

1) *No lateral movement within the bearing.* Roller bearings are designed to *roll* the load, not slide it. Lateral movement, such as occurs in straight roller bearings, scuffs rollers and races. As they move laterally, the pumping action forces lubricant out of the seal, sucks dirt and water in. And auxiliary thrust devices—not completely effective, hard to lubricate with grease and requiring extra maintenance—are necessary.

In Timken bearings, the taper prevents free lateral movement—and the problems it creates. Timken bearings don't pump, don't scuff, don't score. Not only does the hot box problem end—you save on lubricant and maintenance, get longer bearing life.

2) *Positive roller alignment.* The taper keeps the roller ends snug aganst the rib. This wide-area contact keeps the rollers aligned. Timken bearing rollers can't skew to upset the full line contact and shorten bearing life.

When you switch to roller bearings to end hot boxes and cut costs, remember: Timken is the only journal bearing you can fully count on to end the hot box problem and cut operating and maintenance costs to a minimum—it's the taper! The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".



THE TAPER MAKES TIMKEN THE BEARING YOU TRUST

TRADE-MARK REG. U. S. PAT. OFF.

NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ↓ AND THRUST →◫← LOADS OR ANY COMBINATION →✳←